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NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Independent Dyestuff Makers

THE REAL POSITION in regard to the reported agreement between the British Dyestuffs Corporation and the I.G. is still far from fully disclosed. It is only a trifle clearer than a week ago. The dyestuff manufacturing firms outside the Corporation have laid their case before the Board of Trade, and the Chemical and Dyestuff Traders are to wait on the Board next week. The terms of the agreement, it is understood, were not disclosed to the deputation, and what exactly took place at the interview is not known.

The really significant thing is that the interview took place at all, for it shows that the independent makers are not parties to the negotiations, and are seriously concerned about the effect upon their interests. The dyestuff industry, on the manufacturing side, is thus divided for the first time into two sections, and that from every point of view is to be regretted. While it stood united it could confidently meet opposition, but internal division is bound to weaken the position. At the moment, of course, it is not certain that the division will endure, but it seems clear that unity can only be secured by treating the industry as a whole and securing equality of terms for all its members. The nation could not afford to see the Corporation go under, though a few people might rejoice, but neither can the nation afford to sacrifice the independent makers, who constitute collectively nearly half of the whole, and many of whom are already working on a sound commercial basis, and did so even in pre-war days. We have heard it said that the independent makers will gain equally with the Corporation. That may possibly prove to be so, but the makers are nervous on the point, and it is advisable that the position should be made clear.

So far as we know, the users have not yet taken any official action, preferring to wait until the facts are known. The traders, however, are alarmed, and are certain to fight hard against their exclusion from the dyestuff importation business. We believe that the importers as a whole would not only object to any exclusion in favour of the Corporation, but would also strongly oppose the restriction of licences to recognised agents of foreign firms. The difficulty at present is that no one really knows the facts or is in a position to form a definite judgment except on general principles. This uncertainty is not good for the industry in any aspect, and the sooner the mystery is removed the better for all parties. At least they will then know where they stand.

The Maclaurin Process in Scotland

FOR some fifteen years now we have had the principles of low temperature carbonisation thrust upon us, and many are the processes which have from time to time been heralded as "the real thing at last" for the production of smokeless fuel. That the majority of these methods seem to have shown their greatest proficiency in doing the disappearing trick, is, perhaps, not altogether their fault from the technical standpoint, but because those who have too glibly accepted the problem as purely one requiring structural ingenuity have subsequently learned that technical perfection is of little avail if it is faced with commercial insolvency. We have always maintained that the smokeless fuel problem will only be solved when the retailer of such fuel can sell it for something less—or at least not materially more—than the prevailing cost of coal—but not before. Technically, there is far less cause for worry, for since the Fuel Research Board attacked the whole problem from an entirely dispassionate and unconvinced standpoint it would seem that no real problems stand in the way. In one or two other directions, too, significant progress has been made, not the least interesting departure being the decision of the Glasgow Corporation to conduct experiments with a five-unit battery of Maclaurin producers. The Maclaurin system has always been thought well of by those in a position to judge, and it will be recalled that

it was put on trial some time ago at Grangemouth, where a plant exists for carbonising from 20 to 24 tons of coal per day. It has been stated that the results there have been successful with all classes of coal and that it was possible in the one plant to produce at will either soft fuel for domestic purposes or hard coke for metallurgical use.

It is now possible to give some indication of the results which representatives of the Glasgow Corporation obtained from the Maclaurin plant during a special four-days' trial which they carried out at Grangemouth. In a recent paper Mr. Robert Sturrock, who was engaged on the experiments, pointed out that the fuel obtained, after being screened, resembles ordinary gasworks coke. On closer examination, however, a considerable difference is observed, for the structure appears to resemble that of the original coal, the fuel is much harder and darker than coke, and the opinion was formed that it would meet a long-felt want, and that with further experience a still better article could be put on the market. The technical results now published are particularly interesting. From a ton of coal the yield of semi-coke was practically 12 cwt., the yield of oil, which has a much lower gravity than coal tar, was 15·6 gallons, while the sulphate of ammonia produced was 14·5 lb. It must not be pretended that such a products balance sheet looks like permitting the semi-coke to be sold for a price equivalent to that of coal, and one is, perhaps, a little curious to know why the sulphate of ammonia yield is so low. However, Glasgow should soon have its own plant in operation, and there will be many who will await with interest the publication of the results obtained.

Mr. A. E. Barton and the Claude Process

THE failure of Mr. Alfred Ernest Barton, the founder of Cumberland Coal Power and Chemicals, Ltd., recalls an enterprise which at the time attracted considerable interest in chemical circles. Mr. Barton, who was formerly interested in South African and Western Australian mining enterprises, came to England in 1897 and engaged in several company promoting schemes. At the end of 1918 he estimates that he was worth between £80,000 and £100,000. The following year he put the bulk of his money into Cumberland Coal Power and Chemicals, Ltd., which was formed to acquire collieries in Cumberland and the British and Colonial rights in the Claude synthetic ammonia process. This company went into liquidation in December, 1922, and Mr. Barton's affairs, at the examination last week, disclosed liabilities amounting to £110,802, with a deficiency estimated at £34,769. Thus comes to an end an enterprise about which much was at one time heard.

It is now nearly four years since Cumberland Coal Power and Chemicals, Ltd., publicly announced on a large scale their acquisition for this country, South Africa, Australia, New Zealand, and India of all rights in the French process for the fixation of atmospheric nitrogen. It was at that time intended to form an English company, to be known as Atmospheric Nitrogen and Ammonia Products, Ltd., with a capital of two-and-a-half million, to acquire the share capital of Cumberland Coal Power and Chemicals, Ltd., and to erect a synthetic ammonia plant on freehold land adjoining the Allendale coke oven plant at Great Clifton, Cumberland. The first unit of this plant to be installed was to have a production capacity of 50,000 tons of sulphate per annum, and on this an annual net profit was estimated of £500,000. There was some idea also of installing a small plant for the production of chloride of ammonia, and of popularising this product as a fertiliser in preference to sulphate. The fertiliser value of ammonium chloride, it was claimed, was equal to that of ammonium sulphate, and that, as the chloride was less weighty than the sulphate relatively to the fixed nitrogen content, it would be less expensive to transport. These attractive projects, however, never materialised, and Brunner, Mond and Co. are not likely to have any rivals in this country in the production of ammonia by the direct synthesis of hydrogen and nitrogen.

The Storage of Volatile Liquids

IN some way or other the majority of industrial chemists are concerned with the storage of volatile liquids. Apart from the question of petrol and other petroleum fractions there is the matter of such products as benzol and the primary coal tar fractions, and if the loss due to evaporation, where large quantities of these products are concerned, could be accurately gauged, the result would probably prove disconcerting. It has been found that in general handling the greatest losses occur in connection with the filling and emptying of storage tanks, while next in extent are those which arise from the "breathing" of the tanks under changes of temperature and other climatic conditions. On previous occasions attention has been drawn to the means which have been adopted for curtailing losses of the kind, and we note in a recent issue of *Engineering* that attention is given to various modifications of storage tank design and construction which have been suggested with a view to improving the usual state of affairs. The writer is mainly concerned with petrol, but a point which he raises (and which applies to the majority of volatile liquids which are stored in bulk) is one which might easily be overlooked, and might quite unwittingly cause trouble between manufacturer and purchaser. We refer to the statement that when evaporation losses occur the actual loss in quantity is not nearly so serious as the loss of the fractions themselves, which, in order to bring the product back to selling specification, have to be replaced at considerable trouble and expense. In some instances, of course, it is very possible that the incidence of evaporation from this standpoint may be overlooked, so that a product may be disposed of which is not up to specification.

The elimination of loss of the kind takes effect in two directions. The factors which affect the evaporation, for instance, of stored petrol are the renewal of the air in contact with the liquid, the temperature of the surface of the liquid, the area of the evaporating surface, and the quantity of vapour in the air in contact with the surface. The work carried out has been directed towards preventing the renewal of the air over the surface, the maintenance of the liquid and

air at suitable temperatures, and the reduction of the exposed liquid surface.

It is, perhaps, not realised outside the industry, and, in fact, has not long been realised within it, how "breathing" under ordinary climatic conditions may result in considerable loss. American tests in the case of a storage tank (30 feet high) having a capacity of 55,000 barrels of petrol and filled to within one foot of the top, are helpful in gauging what is likely to happen. The air space remaining in such a tank is 34,330 cubic feet, and if the temperature of this were raised 40° F., some 2,800 cubic feet of gasoline-saturated vapour would be expelled. If the tank were only half full, under the same change of conditions, no less than 14,500 cubic feet of vapour would be expelled. The air thus driven out often contains 80 per cent. of petrol vapour, and the loss is thus heavy. Under summer conditions a range of 70° F. may occur in 24 hours, when the "breathing" loss for a tank filled to 29 ft. would be about 3,700 cubic feet, equivalent to something like 97 gallons of petrol. These figures are taken for vapour-tight tanks furnished with relief valves. Certainly there are means available which will curtail all ordinary losses by about half, but the point which is likely to be lost sight of is whether the cost of the cure might not exceed the value of the loss it is designed to treat.

The Messel Lecturer for 1924

In awarding to Viscount Leverhulme the Messel Memorial Medal for 1924 the Society of Chemical Industry has secured for the annual meeting at Liverpool in July a lecturer who can speak on the applications of chemical science to industry out of an unusually full, if not quite unique, commercial experience. Two years ago at Glasgow Professor Armstrong, the first recipient of the Messel Medal, gave us a brilliant study of the life and character of Dr. Rudolf Messel, with much of his own thinking on the subject of chemical change thrown in. This year one may expect a different type of address, with the emphasis laid on practice rather than on theory, on the commercial more than on the scientific aspects of chemistry. Lord Leverhulme is a world figure, the head of one of the greatest industrial and commercial organisations ever built up. His success, it is true, is not the result of applied science alone, but it is certain that a right understanding of the part which science plays in industry and a knowledge of how to utilise the services of the chemist in the right way have been among the essential conditions of that success. The soap industry and the allied branches with which it is now associated involve chemical processes and operations covering an immense field, and if Lord Leverhulme can give even a general glimpse of what chemical research and the application of its results have accomplished in his own case, the lecture should be of high interest and practical value. It is appropriate that the President of the Society should himself be a distinguished chemist whose work has been largely done in this field. For Dr. E. F. Armstrong it is a singularly happy circumstance that the Messel lecturer in the year of his election should be his father and in the year of his retirement should be his commercial chief.

Points from Our News Pages

The hearing of the claim in connection with the production of mustard gas was concluded on Monday (p. 134).

Further information is given on the proposed Anglo-German Dye Agreement (p. 136).

Dr. E. K. Rideal delivered his third Cantor Lecture on the Chemistry of Colloids on Monday (p. 137).

Sir William Bragg, at the Royal Institution, dealt with the work of the Davy-Faraday Laboratory (p. 139).

According to our London Market Report a satisfactory volume of business has passed during the past week (p. 148).

Business during the week has been quiet according to our Scottish Market Report (p. 151).

Books Received

Fats: Natural and Synthetic. By Dr. W. W. Myddleton and T. Hedley Barry. London: Ernest Benn, Ltd. Pp. 182. 25s.

Vanadium Ores. By Members of the Scientific and Technical Staff of the Imperial Institute. London: John Murray. Pp. 72. 5s.

The Calendar

Feb.		
11	Institute of Metals (Scottish Section): "The Properties of Some Non-Ferrous Alloys." Robert Hay. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
11	Ceramic Society: "Manufacture of Pottery." John Miles. 7.30 p.m.	Stoke-on-Trent.
12	Northern Polytechnic Institute Chemical Association: "Chemical Vision." Major V. Lefebure. 8 p.m.	Holloway, London, N.
12	Institute of Metals (Birmingham Section): Discussion upon "Waste Products and Losses in the Non-Ferrous Metal Industry." 7 p.m	Chamber of Commerce, New Street, Birmingham.
12	Society of Chemical Industry (Edinburgh and East of Scotland Section): "Viscosity of Rubber." J. A. Watson. 7.30 p.m.	36, York Place, Edinburgh.
12	Royal Photographic Society of Great Britain: Discussion on "The Place of Research in Industry." 7 p.m.	35, Russell Square, London.
13	Institute of Metals (N.E. Coast Section): "Propeller Brass." A. Logan. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
14	Royal Society. Papers by Dr. C. Chree, C. E. T. Mann, D. H. Bangham, F.P. Burt and others. 4.30 p.m.	Burlington House, Piccadilly, London, W.1.
14	Royal Institution of Great Britain: "Crystalline Structure of Organic Substances" (Lecture II). Sir William Bragg. 5.15 p.m.	21, Albemarle Street, London, W.1
14	College of Technology Chemical Society, Manchester: "Osmosis and Osmotic Pressure." Professor J. S. Haldane. 4.30 p.m.	Manchester.
14	Institue of Metals (London Section): "Metals for Lamp Manufacture." W. B. Clarke. 8 p.m.	85-88, The Minories, Tower Hill, London, E.1.
14	Optical Society: Annual General Meeting.	Imperial College of Science and Technology, South Kensington, London.
14	Institution of Chemical Engineers: "The Transport, Storage and Distribution of Hydrochloric Acid." D. M. Newitt. 8 p.m.	Engineers' Club, Coventry Street London.
14	Society of Dyers and Colourists (London Section): "Staining and Dyeing." Professor J. F. Thorpe. 7 p.m.	Dyers' Hall, Dowgate Hill, E.C.
15	Royal Society of Arts: "Salt Manufacture in India and China." Sir R. M. Dane. 4.30 p.m.	John Street, Adelphi, London, W.C.2.
15	Institute of Metals (Swansea Section): "Fatigue and the Elastic Limit." Professor C. H. Desch. 7.15 p.m.	University College, Singleton Park, Swansea.
15	Institute of Metals (Sheffield Section): Conjoint Meeting with the Institute of British Foundrymen. 7.45 p.m.	The Albany Hotel, Fargate.
16	British Association of Chemists (London Section): 3rd Annual Dinner.	Engineers' Club, Coventry Street, London, W.1.

Chemists' Claim for Mustard Gas Production

The Hearing Concluded: Judgment Reserved

THE hearing of the claim of Dr. Levinstein, Professor Green and the British Dyestuffs Corporation for an award for the production of mustard gas before the War Inventions Commission was concluded on Monday, and judgment reserved. Mr. Justice Tomlin presided and was assisted, as before, by Mr. Norton, K.C., and Mr. Chaston Chapman.

An Outline of the Day's Evidence

At the outset Mr. Justice Tomlin, who had previously commented on the length and costliness of the proceedings, issued an ultimatum to counsel that the case must be finished that day. It was accordingly finished, the Commission sitting nearly two hours beyond the usual time, and at the close judgment was reserved. The evidence for the Crown was all designed to show that the process and plant at Avonmouth were not influenced by any information supplied by the claimants, and that the changes introduced in order to keep the sulphur in solution were based on French information and experience. On this subject an important witness was Mr. Whitelaw, who was responsible for the Avonmouth plant. A big figure, with a Scottish accent, he told his story pleasantly, with his hands thrust deep in his breeches pockets, but when counsel pressed him a little hard he retorted with unexpected vigour. Another interesting witness was Mr. Shepherd, a chemist who for a time was employed in the Levinstein works at Blackley, and who spoke in the Blackley accent. He, too, had a turn with counsel, but was always on level terms. It was to reply to this witness that Dr. Levinstein was recalled to show that they had no serious trouble with sulphur deposits.

The closing speeches of counsel recalled the real issues before the Court. For the Crown it was argued that Sir William Pope's Patent Specification covered all that the claimants had done, and that the practice at Avonmouth was not influenced by anything that happened at Blackley. Claimants' counsel admitted that if the Patent Specification was as broad as the Crown had claimed, his case must fail, but his contention was that the Levinstein product was not the Pope product and that its production amounted to an independent invention. It was thus clear that the case went far beyond the claim merely that the Levinstein works were the first to produce mustard gas on the basis of the Pope reaction. The claim was for the invention of something different.

At the close Mr. Justice Tomlin formally announced that the Commission would consider their award. The *obiter dicta* which fell from the Bench seemed to indicate a leaning first to one side and then to the other, but the unwisdom of making any deduction from these casual remarks is proverbial, and nothing but the award can show what is in the Tribunal's mind.

Evidence of French Production

Mr. Gray first called Monsieur de Kap Herr, who was head of the French organisation of mustard gas factories. The evidence was taken in French with the assistance of an interpreter. M. de Kap Herr gave evidence as to the amounts of mustard gas filled into shells at the Pont du Claix works, which amounted to 253,000 kilos by the end of October 1918. In all about 350,000 kilos were made in France by the low temperature method, which was about one-sixth of the total French product, the remainder being obtained by the bichloride process. There were some accidents when working on the experimental scale, but after full production started on May 19 there were, he thought, only 40 or 50 casualties reported. These were mostly due to the mustard gas affecting the lungs. The witness emphatically denied the suggestion that German prisoners had had to be employed. After an explanation by Mr. Moritz that he would not have raised that point without information the matter was not pursued further.

Mr. Moritz cross-examined this witness largely in the light of a report signed by him. M. de Kap Herr said that the low temperature process was used in two or three other places in France besides Pont du Claix. The low temperature was used in combination with 4 atmospheres pressure and the sulphur was intended to be separated out, but it sometimes came out in a liquid form, which was difficult to deal with. Mustard gas was also being produced with sulphur unseparated, but this was not thought to be very satisfactory.

Sulphur Troubles at Blackley

The next witness was Mr. Douglas H. Shepherd, who acted as a shift-chemist in the Levinstein factory from July 11, 1918. His evidence was to the effect that there was continual trouble in the plant from sulphur deposited in the pan and pipes. The charge had often to be pumped out by a rotary pump which was fixed up. He improved the yield considerably by having the pan cleaned out with sulphur chloride before starting a new batch. On one occasion over 2 tons of sulphur chloride were used to clean out a new pan.

Mr. Hunter Gray: Would it be right to say that at any period during the time you were in charge was the plant working smoothly and that no sulphur troubles occurred? No, it would not. We could never rely on having a batch without sulphur depositing.

Mr. Moritz, cross-examining for the claimants, put it to witness that one of the most serious troubles experienced whilst he was at Blackley was through a water leak from the cooling coils into the vat and that that was the cause of the complete blockage referred to by the witness.

Mr. Shepherd said that had been suggested but had never been proved.

Mr. Moritz said that Dr. Levinstein and his chemists tracked that trouble down and cured it. The result was that the plant was dismantled and the faulty coil replaced and the whole plant, which had been put out of order in consequence, re-erected.

Witness said that steam had to be used to clear the pipes, although he admitted that a leak of water into the vat in this way would account for the deposit of the sulphur.

Dealing with the explosion, the witness would not agree that it was due to the carelessness of the workmen and not to imperfections in the process, but counsel got from him the agreement that whilst the explosion was actually caused through the inadvertent closing of a valve whilst the pan was being boiled out with sulphur chloride, the boiling was necessitated by the deposit of sulphur during the working of the process.

Counsel pressed the point as to the explosion being due to carelessness.

Mr. Justice Tomlin: The answer is that there was a deposit of sulphur which necessitated a certain operation and while that operation was taking place this accident occurred.

Mr. Moritz then put it that these accidents happened seldom and were perfectly easily got over. Otherwise how could there have been a continuous output, which in fact there was?

Witness: I deny that. I worked on the plant and it was in spite of these difficulties that we got a continuous output. But for the sulphur deposit the output would have been considerably larger.

When the settling tanks were dismantled there was practically no deposit of sulphur?—That is not true. I say there was a foot of sulphur.

I put it to you that your evidence is entirely inaccurate and that the amount of sulphur in the settling tanks was negligible?—That is not true.

In answer to further questions, the witness said that the settling tank was 9 ft. by 7 ft. by 3 ft. deep and that there was always 1 ft. of sulphur in it.

In re-examination, the witness said there was always sulphur in the returned drums.

No Changes at Avonmouth

Dr. S. I. Levy next gave evidence. He had visited Avonmouth on various dates, and had assisted in the design of the plant there. The temperature of working was lowered on July 5, and at that time there were agitators in the plant. He then visited Blackley, where he saw one or two novel features, but nothing new was introduced at Avonmouth as a result, except a gas holder for the ethylene.

Mr. Justice Tomlin: What puzzles me very much is that on July 6 there was successful production at Blackley and not at Avonmouth. Why those at Avonmouth should have taken so little interest in what was being done at Blackley I cannot understand.

Mr. J. Hunter Gray said that his instructions were that the manufacture at Blackley was not satisfactory and that according to Dr. Levy the production at Avonmouth was more satisfactory.

Mr. Justice Tomlin: It was really only on August 17 that substantial and regular deliveries from Avonmouth began.

Dr. Levy: That would be after bringing the big plant into operation.

Mr. Justice Tomlin: But you do not seem to follow what I am putting to you. It is difficult for me to appreciate your mental state of mind early in July when you visited Blackley when they were producing regularly, and apparently taking no interest in what they were doing when you were not producing regularly at Avonmouth.

Dr. Levy said the design of the large plant at Avonmouth had then been completed and he found nothing at Blackley which justified a change in that plant.

Mr. Justice Tomlin: That is quite inconsistent with what Mr. Curtis has said.

Dr. Levy said that in his opinion there had been an amount of care and technical knowledge displayed in the designs of the Avonmouth plant which was entirely lacking in the Blackley plant.

Mr. Justice Tomlin: That sort of observation does not help us very much.

Dr. Levy, continuing his evidence, said that the higher temperature was never used on the large plant because by the time that was ready for working they had received the information from the French as to the advantages of the lower temperature. When the plant was at work, sometimes the sulphur was kept in and sometimes it was not.

Mr. Justice Tomlin pointed out that according to the letter from Professor Gibson, already referred to at the previous hearings, they were not keeping the sulphur in at Avonmouth, but were hoping to obtain an identical product to the Levinstein, which meant keeping the sulphur in. The evidence of the witness on this point was not assisting him, because the documents made it clear that they were trying to keep the sulphur in at Avonmouth.

The witness admitted that they never succeeded in doing it regularly, but it was done occasionally.

Cross-examined, the witness said the reason why iron vessels were used at Avonmouth was that there was no time to lead line them, and it was not a change in the plant after seeing the Blackley plant.

Evidence of Mr. Whitelaw

Mr. R. F. Whitelaw, who was chief superintendent at Avonmouth factory in 1918, gave evidence to the effect that he had designed the experimental and production plants at Avonmouth. Agitation by the bubbler in the experimental plant he considered inadequate, and suggested using sulphonators from the existing picric acid plant which already had agitators and disruptors. This was carried out in the main plant which started operation on July 26. Working at the low temperature had begun in the experimental plant, first at 40° at the French suggestion, and then at 30° in order to lessen the danger of overheating. Mr. Curtis, who had given evidence for the claimants had been employed as acting manager on part of the plant, and he had sent him to Blackley on the suggestion of Mr. Quinan. Witness said he made no change in the plant as a result of Mr. Curtis' visit to Blackley. He had introduced control of the ethylene for observation purposes, and had doubled the size of the purifying plant. Mr. Quinan had informed him of the need of very pure ethylene.

In cross-examination by Mr. Moritz, Mr. Whitelaw stated that he was not a chemist, but an engineer and mining contractor.

Mr. Moritz: No doubt you are very efficient.

Mr. Whitelaw: Oh, there is no doubt I am very efficient. (Laughter.)

The witness explained that he studied the chemical aspects of the subject when he was at Avonmouth; he was not at the mercy of his chemists. (Laughter.)

He had been instructed to carry out the manufacture of mustard gas according to Professor Pope's method, with the separation of sulphur. He learnt from the visit of Major Froissart that sulphur could be kept in solution by working at a low temperature. He had not been present on the occasion of Sir William Pope's visit when the latter had said that there were features at the Levinstein plant which should be copied. The only instructions he had received were from Mr. Quinan.

Mr. Moritz: It is a very curious thing if Mr. Quinan had known for months, as we say he did, that Levinstein's were holding the sulphur in solution, that he never took any steps to have that carried out at Avonmouth?

Mr. Whitelaw: Very curious, if he knew it.

Asked if it was not the fact that Sir William Pope had reported that there were features of the Levinstein plant which he thought ought to be incorporated in the Avonmouth plant, the witness said that on the contrary he had heard it said that Levinstein's were about to copy the Avonmouth plant.

Mr. Moritz pressed this last answer in order to ascertain further details but eventually witness withdrew it.

This concluded the evidence for the Crown.

Mr. Moritz here made a few remarks on the agreement proposed between the claimants and the Government at the time. The mustard gas was to be sold at cost price plus 1½d. per pound for profit or overhead charges. The total sum was £89,000, which had been paid after ten months' delay. His Lordship remarked that was not an unreasonable time.

Dr. Levinstein Re-called

Dr. Levinstein was then re-called to give evidence on the troubles in his plant arising from the deposit of sulphur. He said that when the plant was dismantled 1 ft. of sulphur sludge was found containing about 25 per cent. of sulphur—amounting to about 1 ton accumulated from 6 or 7 months' working—about 3 per cent. After a blockage in the pan due to leakage of water, 2 tons of sulphur chloride were used in cleaning it out. As to the stoppages in the pipes, this was a small matter, especially as the pipes were only 2 inches in diameter.

Mr. Hunter Gray subjected the witness to a long and detailed cross-examination regarding the sulphur troubles on the plant. Dr. Levinstein stated that whenever anything went wrong through carelessness there would be a small deposit of sulphur which might easily block a pipe or valve. It was not a matter of great importance and did not hinder production. The chief obstacle to high output was the limited production of ethylene.

At the close of the cross-examination, Mr. Justice Tomlin said he did not see that it had helped very much. All the cases mentioned in the log books were works troubles, which were very different from troubles which held up production. In the cases mentioned there had been small deposits of sulphur, but they did not hold up production.

The Case for the Crown

Mr. J. Hunter Gray in the course of his final speech for the Crown referred to the statement made at the end of the claim by the applicants as follows:—"If the process and the product are completely covered by Professor Pope's patent, the claimants cannot recover under Clause 3 before this Tribunal." He contended that that statement in the applicants' claim deprived them of any right to an award at all because, in his submission, the process at Blackley was identical with, and was covered by, the patent specification. Even assuming that this statement had not been made in the claim, he still maintained that the claimants were not entitled to an award for several reasons. To some extent these reasons were more or less inter-twined with the scientific position. In his opening statement, Sir Duncan Kerly had said he did not care whether what the claimants produced was a disulphide or a monosulphide. The witnesses for the claimants had said that it was a disulphide: what in fact was produced was a monosulphide plus sulphur. If, on the other hand, what was produced was a body which did not deposit the sulphur but which contained sulphur in some form in a clear liquid, then it came within the patent specification. He claimed that the patent specification covered monosulphide at all temperatures from 0° to 60° and he knew of no circumstances where it could be said that because it was a mono-sulphide all the sulphur should be taken away. The process in both cases was ethylene and chlorine re-acting together, which was the process covered by the patent specification, and not only was the product at both Blackley and

Avonmouth the same but the process was the same. The claimants must show that what they produced was not a mono-sulphide and he claimed that his evidence had shifted that onus upon the claimants.

The Case for the Claimants

Mr. Moritz replying for the claimants referred first to the question of the amount of profit to be allowed to Messrs. Levinstein for the mustard gas they had made, which was quite distinct from the question of the award asked for. This matter of profit, however, he said he could safely leave in the hands of the Commission.

Mr. Justice Tomlin said his own feeling about the case was that £ s. d. had not been in the minds of the parties at all, and that had been distressing him.

Mr. Moritz said he was instructed to say that his clients hoped his Lordship would not take that view, particularly Professor Green, who was not a wealthy man.

Mr. Justice Tomlin said he meant that they had been trying a dispute as to priority of claim to an invention.

Mr. J. Hunter Gray said that those who instructed him wished him to say that they had not attempted to put forward this case on a question of pure priority.

Mr. Justice Tomlin said he had not made his remark by way of criticism of the conduct of any of the parties. It might be that circumstances were such that it was inevitable that Counsel had been put in the position they had.

Mr. Moritz in the course of his final speech for the claimants said they had come before the Commission to put forward a straightforward and moderate claim, and found themselves involved in a controversy which seemed to be a matter of personal kudos, and which put them in the unfortunate position of appearing to fight Professor Pope's reputation. The Crown had stated that the claimants' process was the same as that described in the patent specification, but the onus was on the Crown to prove that it was the same product. The claimants said it was a different product and Sir William Pope said it was the same product.

Mr. Justice Tomlin: I do not believe that either of you knew what you were producing; whether it was disulphide or monosulphide.

Mr. Moritz said that Dr. Levinstein discovered that by working in the cold it was possible to get a yield of from 90 to 95 per cent. as against 10 per cent. as stated by Sir William Pope in the specification. At Blackley they discovered violent agitation at a low temperature.

Mr. Justice Tomlin said he was not satisfied on the evidence that there was agitation at Blackley which was in excess of that used at Avonmouth.

Mr. Moritz said that might have been the case at the end. In any case, his clients said that theirs was a different product, but they did not care to label it themselves. They believed it was a di-sulphide and that it was something different was seen in the fact that Professor Gibson had spoken of the desirable Levinstein product, which so surprised Mr. Quinan that when he heard of it he told the people at Avonmouth that they were all wrong and must stop.

Mr. Justice Tomlin said he thought that Sir William Pope had said that there might be such a great variation in the results that there could be a yield of 10 per cent. in the cold and 90 per cent. at the high temperature.

Mr. Moritz said they had not had evidence from Mr. Quinan, although it could have been taken on commission, but he was the chemical engineer in charge at Avonmouth, and he had been told in May, 1918, that at Blackley they were working at low temperature with the unexpected result that they got the sulphur in solution. As a result, various people were sent to Blackley to see what was being done. There was a keen interest in the work at Blackley and if it had not been for Blackley, Avonmouth would never have been a practical proposition at all.

Mr. Justice Tomlin said he was not quite sure. He could not help thinking that those who knew about it did not believe in it and did not believe that sulphur was kept out until a much later stage. They were working out things in their own way at Avonmouth with the assistance of what they had learned from the French, and it might be that they both ultimately came to the same goal.

The decision of the Tribunal will be announced later.

The Reported Dyestuffs Combine

British Makers' Deputation to Board of Trade

A DEPUTATION representing the Dyestuffs Group of the Association of British Chemical Manufacturers attended at the Board of Trade on Monday to lay before the Board the views of British dyestuff manufacturers outside the British Dyestuff Corporation on the reported draft agreement between the Corporation and the German I.G. The deputation consisted of Major L. B. Holliday, chairman of Holliday and Co., Huddersfield; Dr. A. E. Everest, of J. W. Leitch and Co., Huddersfield; Mr. W. F. Clayton, of the Colne Vale Dye and Chemical Co., Huddersfield; Mr. J. E. Southcombe, of the Southdown Chemical Co., Birkenhead; Mr. F. G. Williams, of Williams Brothers, Hounslow; Mr. W. D. Winslow, of the British Alizarine Co., of Trafford Park, Manchester; and Mr. J. L. Major, of Major and Co., Hull. The deputation was received by Sir Sydney Chapman, the Permanent Secretary, and Mr. Percy Ashley, the Assistant Secretary. Major Holliday presented the case of the dyemakers, and expressed strong objection to the proposed agreement on their behalf.

The proceedings were private, but it is understood that the Board of Trade representatives promised that they would report what had taken place to the President of the Board of Trade and gave assurances that the arguments would be most carefully considered. The feeling of the deputation afterwards was that although there had been no definite result something had been gained, as it is now certain that the case of the manufacturers outside the B.D.C. will be taken into account before any further steps are taken. Nothing, however, appears to be definitely known about the draft agreement, and discussion is still hampered by the lack of definite knowledge.

A rumour that the negotiations for the Anglo-German agreement had been dropped was circulated during the week, but so far no confirmation of this can be obtained.

British Traders' Attitude

The British Chemical and Dyestuffs Traders' Association, which represents the importers and distributors of foreign dyes, have, as reported, held a meeting of protest in Manchester, and passed a resolution demanding that before the agreement is completed the details of the proposals shall be placed before the trade and Parliament. Mr. O. F. C. Bromfield, the secretary of the Association, states that they informed the Board of Trade that they wished also to send a deputation to protest against the combine. In doing so the Association asked the Board of Trade to be supplied with a copy of the draft agreement in strict confidence. The reason for this request was that they thought it would be difficult, if not useless, to discuss the agreement without knowing what it contained. The Association have received a letter from the Board declining to furnish the Association with a copy, even in confidence, and they have further been informed officially that no copy of the agreement will be on the table when the deputation is received. The date of the deputation from the traders has been fixed for February 14.

Negotiations at a Standstill

The Berlin correspondent of the *Manchester Guardian*, who first published the supposed terms of agreement between the British Dyestuffs Corporation and the I.G., now indicates that there may be little or nothing in it after all. "Negotiations," he states, "over the much-discussed Anglo-German dyestuffs agreement have, as I hear from interested quarters, come to a standstill, although they have not definitely been broken off for good. They began about four years ago. At Frankfort representatives of the German dye industry carried negotiations very far. The British Ambassador in Berlin, Lord D'Abernon, was particularly helpful and zealous in promoting the agreement. Nevertheless, nothing final was decided. When it seemed that the British Government would introduce Protection the Germans again took up the British proposals. When Protection was defeated the interest of the Germans again diminished. At present the German dye industry has no immediate and urgent interest in coming to an arrangement with the British Dyestuffs Corporation, although its future and more general interests do perhaps lie in this direction. The negotiations may be taken up again, but it is not likely that a definite working agreement will be reached in the near future.

The Chemistry of Colloids

Dr. Rideal on the Properties of Emulsions

DR. ERIC RIDEAL gave the third and last of his course of Cantor lectures on Colloid Chemistry at the Royal Society of Arts on Monday.

The greater part of the lecture dealt with the subject of emulsions. As an emulsion consisted of a liquid phase dispersed in another liquid phase—*i.e.*, oil dispersed in water—it was evident, the lecturer said, that with the same pair of liquids it is possible to obtain another emulsion with inverted phases—*i.e.*, water dispersed in oil. The great problem, however, was the stabilisation of such emulsions. The two general methods of stabilising dispersed solid phases were the introduction of electric charges or the formation of a surface film. These same methods could be employed in the case of emulsions also, the lowering of the interfacial surface tension by the addition of a stabilising agent being, however, most general. For a definite film to be formed at the interface between two liquids the stabilising agent must lower the surface tension of both liquids.

After briefly indicating the conditions in which stable and unstable emulsions of oil and water were obtained, it was pointed out that the property of inversion of the more usual oil in water emulsions to a water in oil emulsion by a change in the stabilising agent from, say, a sodium oleate to a calcium oleate, had been made use of in industrial operations and appeared to be of fundamental importance to the biologist. Lubricating oils which contained a small quantity of fatty acids or alkali metal soaps, on admixture and dispersion with water, would naturally form an oil in water emulsion, but on the addition of a trace of lime the phases would invert and we obtained a grease with oil as the continuous phase.

Stabilisation of Emulsions

Emulsions, therefore, required stabilising agents which naturally varied with the type of emulsion. In the case of milk, the milk fat was emulsified in water, being stabilised by the naturally occurring albuminous substance casein which, in turn, was protected by the last albumen. In rubber latex the hydrocarbon complex of isoprene and its homologues was apparently stabilised by a naturally occurring protein, apparently not without effect on the rate of vulcanisation.

Since emulsoids possessed a lower interfacial surface tension than suspensoids, they did not absorb ions from solution as readily as the colloidal metals and were thus not so sensitive to precipitation. Emulsoids, however, were by no means insensitive to electrolytes and an emulsion would break and separate into its phases when the electromotive potential had dropped to below the critical value of $\pm$ 30 millivolts. The breaking of such emulsions was an important problem to be considered in the refining of vegetable and some mineral oils, in the cream and butter industries, and in the preparation of rubber from latex, whilst the need for some test on the protection against breaking for disinfectants employed in the presence of salts was very evident. Coalescence of the emulsoid particles might also be prevented by the addition of solids which were more easily wetted by one liquid than by the other. Pickering had obtained emulsions of oil in water with basic iron copper and metal salts and Moore has done the same thing with the aid of carbon. The jellies or greases prepared in this way are, however, entirely different in structure to the absorbing gels, such as silica alumina or ferric oxide. It was possible to prepare a substance like barium sulphate in a form which is not mono-crystalline or granular, but as a jelly containing appreciable quantities of solvent.

These gels evidently consisted of two phases—the one a solid and the other a liquid—and the question arose as to the structure of the solid phase. Their properties were best interpreted on the assumption that the solid phase of the gels consisted of a number of particles formed together to form relatively short fibrils or threads which intersected one another in all possible directions to form a gel in the irregular meshes and which the mobile phase penetrated. The X-ray examination of a number of gels including silica and vegetable fibre such as cellulose and ramie fibre, had confirmed the presence of a crystalline structure in these gels. Gels consisting of fine fibrils were usually dry and rigid whilst the coarser the fibril the more moist and elastic did they become. Silica and gelatin were cited as examples of each case. The rigid gels might be dried and the interfibrillar liquid removed without collapse and, indeed, it had been found possible to replace the water in a silica gel by other liquids such as alcohol or benzene.

Importance in Dyeing

The gels also possessed many interesting electrical properties which were of great importance in the practice of dyeing the crystalline gels such as cotton, silk, fibre and wool, and in the process of tanning. The gel fibres of wool, silk, and cotton generally acquired a negative charge in water, whilst the positively charged dyes of the methylene blue type would readily be absorbed and thus effect the dyeing of the fabric. In the same way, many positively charged sols of the metallic hydroxides, such as aluminium, iron, chromium and tin, were absorbed and acted as mordants. The fabrics of wool and silk, however, appeared to behave in some respects like gelatin which could obtain either a positive charge in acid solution or a negative charge in an alkaline solution. The most plausible assumption to explain this phenomenon was that these fibres, like gelatin, contained both acid and basic groups, and were, in fact, amphoteric electrolytes. It was thus clear, said the lecturer, that both acid as well as basic dyes could be caused to adhere to silk and wool fibres by attachment to the basic groupings which conferred on the colloid its positive charge in combination with hydrogen ions.

In addition to the colloidal systems to which he had alluded during the course of his lectures, Dr. Rideal said there was another important class—namely, the soaps—many mysteries of which had been revealed by the researches of Professor McBain at Bristol. Soaps dissolved in alcohol to form simple solutions, and in water to form colloidal solutions. The critical examination of the physico-chemical properties of aqueous solutions of soap, he said, had indicated that the colloidal particles consisted of an agglomeration of soap molecules containing water of solvation. These colloidal aggregates were also charged, as shown by experimental work on electric cataphoresis, but they differed from the colloidal aggregates examined in the case of the usual sols and emulsoids, in that the electric mobility of the charged particles appeared to be comparable with that of an ion, and, in addition, the equivalent conductivity was comparable with that of an ion.

In conclusion, Dr. Rideal said that it had been noted in his survey of the properties of colloids that the operation of forces at interfaces might produce unexpected mechanical, chemical and electrical effects, which, however, on ultimate analysis, lent themselves to theoretical treatment and experimental verification. In addition, he had mentioned a great number of technical and industrial operations in which a proper understanding of surface phenomena was necessary before we might legitimately expect an improvement on the somewhat haphazard and rule-of-thumb methods frequently employed. There was however, little doubt that the progress of industrial chemistry would in future be increasingly regulated by the tempo of research prosecuted in the important field of physico-chemical investigation.

Textile Fabrics and Micro-Organisms

AT a meeting of the Society of Dyers and Colourists in London on Tuesday, under the presidency of Dr. Charles Doree, a paper on " The Action of Micro-Organisms on Textile Fabrics " was read by Mr. A. C. Thaysen, bacteriologist to the Admiralty, who dealt with the damage caused to fibres and fabrics by their contamination with what is commonly called mildew. Contrary to what might be expected, he said, cellulose-containing materials, particularly when not incrusted with lignin, constituted a very suitable food for many types of micro-organisms, and fibres such as cotton, linen, jute, and hemp were much exposed to attack by these organisms whenever the moisture content of the fibres exceeded about 10 per cent. One reason why micro-organisms appeared so readily on some fabrics was because the manufacturer favoured the use of starch as a sizing material. The present method of adding an antiseptic to the starch was not very satisfactory. The exclusion of moisture would be an excellent protection, but this was not always possible. It appeared advisable to investigate how far fibres could be impregnated with substances which were inhibitory to the development of micro-organisms without altering their natural appearance and their tensile strength. The use of size should be restricted to such compounds as were not a food substance for micro-organisms.

Reminiscences of Dr. Heinrich Caro

Casual Discoveries in Chemical Research

At a meeting of the Manchester Section of the Society of Chemical Industry, held on Friday, February 1, Dr. Ernest F. Ehrhardt read a paper entitled: "Reminiscences of Dr. Caro." Dr. H. Levinstein presided.

Dr. Heinrich Caro, it was stated, was born in 1834, and first went to Manchester about 20 years later. When he left college, in Germany, he became a calico printer in Mülheim, Alsace, and was sent to England by his employers to buy machinery. He was then so favourably impressed with this country that he determined to return to it as soon as possible, and this occurred about 1855–6. He settled in Manchester, and remained about 12 or 13 years before returning finally to Germany. Frequently, when the question of educating industrial chemists came up for discussion, people advocated the adoption of the German system, and instanced Dr. Caro as one of its best products. Dr. Caro, however, was never educated as a chemist; he was essentially a calico printer. The dyestuffs industry was only just born when he commenced his business career, and it was from this point of view that he studied the science.

Early Days in Manchester

While in Manchester he was engaged by Roberts, Dale and Co. to do some chemical analysis, according to his own statement for a remuneration of £1 per week, while another account placed it at 30s. The difference in the two amounts would probably be considered substantial at that particular period. It was a modest beginning for a man who subsequently became a German millionaire. Aniline colours had been invented by Perkin, who had produced his famous "mauve." Caro also began to interest himself in the same direction in a manner which might possibly be considered somewhat singular. At that time nitro-benzene was used for scenting soap for barbers, and Caro made his first product from this scent. He tried printing aniline on cotton, and hit upon an aniline-black process for printing cotton black. This success so impressed Roberts, Dale and Co. that they took him into partnership. He remained with the firm for ten years, and then returned to Germany, with a competency, for the purpose of undertaking research work at the university of Heidelberg. At that particular period the author of the paper happened to be churchwarden in the English Church of Heidelberg, and was present at the first christening there, which was that of Caro's eldest daughter.

The Mannheim-Ludwigshafen factory (Badische Anilin u. Soda Fabrik) was then in it infancy, and its managers constantly consulted Caro, finally persuading him to join their undertaking as the head of the research department. He stayed with them 25 years and then took a seat on the Board. He was a difficult man to get on with and was constantly quarrelling with his colleagues. Having served his first term of five years as a director, he was in consequence not reappointed, but was "promoted" to the supervisory board, a sort of committee of inspection appointed by the shareholders.

While Caro was in Manchester, Roberts, Dale and Co. had installed a new plant for the manufacture of oxalic acid. A friend of the firm came to them who had discovered a way of making the acid by bubbling coal-gas, as it was supplied in those days, through nitric acid. Caro investigated the process, and it was soon obvious that it would prove more expensive than the use of sawdust, which was then the regular raw material for the manufacture of oxalic acid. Caro, however, noticed that in bubbling the coal-gas through the nitric acid a little nitro-benzene was formed. This was the raw material for making aniline, and in those days was very expensive. Roberts, Dale and Co. were at once appalled at the prospect of nitro-benzene being made in that way, thus causing oxalic acid to become a by-product and their oxalic acid plant to become worthless. The process was promptly condemned, and a discreet silence maintained about it. Many years later the matter became of importance in Germany. The German tar distillers combined and put up the prices of benzene and other crude products to the dyestuffs factories. Caro remembered his old Manchester experiment, and began a repetition of it in his writing room on the window sill. While the experiment was proceeding, Professor Witt, a German, who had also been in Manchester, and who had become a professor at the Heidelberg Polytechnic, called. Caro drew the window curtains to hide the beaker, and then went out with Witt, forgetting all about his experiment. The gas bubbled through the beaker all night. Next morning Caro found there was a little oxalic acid in the nitric acid, but not sufficient to be of any importance. What was important, however, was that on the top of the nitric acid there was quite a considerable layer of oil, and upon analysis it proved to be benzene with a little nitro-benzene in it. The action of the nitric acid on the benzene in the gas had produced nitro-benzene, and this had acted as a solvent and scrubbed the gas of its benzene. It was thus demonstrated that coal-gas contained a considerable quantity of benzene. Further experiments were made with more suitable solvents, a counter-alliance was entered into with the gasworks undertakings, and, in the end, the combine of the profiteering tar distillers was routed.

Element of Chance in Discoveries

Caro always emphasised the element of chance in his discoveries. His invention of the commercial process for making alizarine was an instance. The first production of artificial alizarine had been by the Geneva chemists Graebe and Liebermann. They made dibromanthraquinone which they melted with caustic alkali. They had repeatedly tried to use cheap vitriol for the process instead of expensive bromine, but had failed. The result was commercial failure. The Badische Co. had acquired a considerable quantity of anthraquinone which was apparently wasted. Caro set to work to find some use for it. He made a dye from carbolic acid by treating the carbolic acid with vitriol and oxalic acid, and then decided to make the same experiment with anthraquinone instead of carbolic acid. The experiment was made in a porcelain dish in the laboratory, and as the acid mixture got hotter the oxalic acid decomposed and volatilised. The experiment was a failure. Just then Caro was called away, forgetting to remove the flame from under the porcelain dish. The vitriol went on boiling in his absence, and upon his return the laboratory was full of fumes, the mixture in the dish had evaporated to dryness, and there was a partly charred crust of material around the upper edge of which was a thin pink line. The boiling sulphuric acid had acted on the anthraquinone to give a sulpho-acid, while the charring had decomposed some of the sulpho-acid into alizarine which, with a trace of alumina from the porcelain dish, gave the pink line. This started Caro again on the sulphuric acid process. He took the strongest fuming acid available, and worked with anthraquinone at a high temperature, obtaining sulpho-acids, alizarine and its isomers Also at that particular period, W. H. Perkin (later Sir William Perkin) was also working independently at the same problem and solved it, but Caro had the good luck to get his patent into the English Patent Office one day before Perkin. Caro's patent was 1,938, June 25, 1869, and Perkin's patent was 1,948, June 26, 1869. But for Caro's good luck the English market for alizarine, which was the principal and almost the sole one, would have been closed to the German manufacturers.

The Kelvin Centenary

A committee has been appointed by the Royal Society in connection with the proposed celebration of the centenary of Lord Kelvin's birth on June 26. The committee is composed of Sir Richard Glazebrook (chairman), Professor F. O. Bower (Royal Society of Edinburgh), Mr. W. R. Cooper (Physical Society), Sir John Dewrance (Institution of Mechanical Engineers), Mr. D. N. Dunlop (hon. secretary), Mr. F. Gill (Institution of Electrical Engineers), Sir Donald MacAlister (Vice-Chancellor of the University of Glasgow), Sir Charles Morgan (Institution of Civil Engineers), The Duke of Northumberland (Institution of Naval Architects), Dr. E. C. Pearce (Vice-Chancellor of the University of Cambridge), Dr. Alexander Russell (Institution of Electrical Engineers), and Mr. F. E. Smith (Royal Society). A large number of Dominion, American and foreign men of science and engineers will be attending conferences at the British Empire Exhibition at that time, and July 10 and 11 have been selected as convenient dates for the Kelvin centenary celebrations. These will include a meeting for the receipt of addresses from delegates, at which Sir J. J. Thomson will deliver a memorial oration, and a dinner at which Earl Balfour has promised to preside. There will also be an exhibition of Kelvin apparatus.

Work of the Davy-Faraday Laboratory

The Importance of Crystal Analysis

PROFESSOR SIR WILLIAM BRAGG, F.R.S., in a Friday evening discourse to the Royal Institution on February 1, gave some details of the work being done at the Davy-Faraday Laboratories, to which he was recently appointed director.

Sir William Bragg at the outset spoke of the importance of crystal analysis, and the very large number of applications that it would have in various branches of industry as well as to the sciences. Relating briefly the beginning of the work on this subject, he said that about ten years ago a very brilliant and classical experiment was performed in Germany by Loewe, the purpose of which was to prove that X-rays are a sort of wave, and are akin, in nature, to light. There was a strong conception at that time that the wave length of X-rays was about 10,000 times shorter than the wave length of light, and therefore, if any experiment was to be successful it was necessary to find a case in which the multitude of particles or spacings was 10,000 times smaller than anything used in the case of light. For this purpose Loewe passed a beam of light through a crystal and found that there was a pattern on a photographic plate on the far side of the crystal. The demonstration of the connection between the crystal and the wave was, said Sir William Bragg, a great moment in the history of science. Chemists, biologists, metallurgists, and all men dealing with materials in any form, would have to study this matter and apply it to their own particular problems. To devise apparatus which was not unreasonably costly was the first essential, and his two assistants, Professor Shearer and Dr. Muller, had devised a piece of apparatus for the purpose, which was in actual manufacture at the moment. The apparatus was on view in the Library of the Royal Institution.

X-Rays in Metallurgy

The application of X-ray analysis in metallurgy was then dealt with, it being pointed out that the practice of metallurgy had got far ahead of the theoretical understanding, and therefore at present even X-ray analysis could not give us anything like a full explanation. Discussing the use of tin to form, with copper, an alloy harder and more useful than the original materials, the lecturer likened a pure metal such as copper to an assemblage of atoms which behaved like minute spheres, and were packed together as tightly as possible. When the copper was stretched or bent certain layers of these atoms slid over one another, and the sliding layers were those most densely packed with atoms. These layers formed planes of easy slip or weakness, and a single crystal of copper was very easily distorted, because all the deformation was concentrated on the weak spots. When atoms of aluminium, for example, were introduced, they took the place of some of the copper atoms, and, being larger, tended to lock the layers together and prevent the slip. He acknowledged the splendid work done in this connection by Dr. Walter Rosenhain and others at the National Physical Laboratory, and by Professor Carpenter, and said that X-ray analysis had proved many of the assumptions made before this method of analysis was available.

Value to Organic Chemistry

Another application of X-ray methods, the value of which was emphasised especially, was to organic chemistry, Sir William's reason for doing so being that organic chemistry depended essentially on the position of the atoms in the molecule. Hitherto the organic chemist had drawn his molecule with the atoms in position, and one of the most astonishing things was that he had done it so well without having actually seen them. It was a matter of satisfaction to the chemist to know that X-ray analysis had proved that nearly always the form he had surmised was the correct one. It was interesting to note, said Sir William, that the work upon crystal analysis had resulted in finding the structure of many organic materials, and they were of special interest because it was found that they all began with the diamond. The diamond displayed the fundamental properties of the carbon atom, and so in the diamond we found the first skeleton of organic things. For example, the six carbon atoms were arranged in the benzene ring in the same manner as in the diamond, hydrogens being attached to make benzene. That formation of six carbon atoms was the foundation of half organic chemistry. When the organic crystal was explored it was found to have the same arrangement of six carbon atoms as in the diamond. Carbon atoms did not always come in the ring form, however, but were sometimes straight, as, for example, in the case of the fatty acids. Close investigations had been made in this connection by such men as Langmuir, in America, and Adams, in Sheffield; the work had been followed up in the Davy-Faraday Laboratories, and, as a result, the thickness or length of films of molecules could now be measured to an accuracy of less than 1 per cent. Though the measurement of the thickness or length of organic molecules had been thought of by chemists, never before had it been possible to measure the exact length.

Potash from Leucite

Professor Hinchley at the Society of Chemical Industry

DR. BERNARD DYER, Chairman of the London Section of the Society of Chemical Industry, presided at a joint meeting of the Section and the Chemical Engineering Group at the Engineers' Club, on Monday. The business of the evening was to hear a paper by Professor J. W. Hinchley on "The Manufacture of Potash and other Salts from Leucite."

Professor Hinchley's paper, although intended to be an extension of the one on the same subject which he gave before the Chemical Engineering Group last November, contained much of the information then given, although he dealt a little more in detail with the industrial applications and the chemical engineering aspect. On this latter point it may be pointed out, whilst referring our readers to the report of the paper in our issue of November 24, for general details of the supplies of leucite in the volcanic regions between Rome and Naples, and the manner in which it is being exploited, that a hydrochloric acid process has been developed by Baron Blanc by which practically pure potassium chloride, pure hydrated aluminium chloride, alumina, and silica are obtained. Professor Hinchley spent some time urging the need for greater attention to developing materials for making plant to handle hydrochloric acid. He expressed the opinion that the chemical engineering problems involved are not difficult to solve. As regards a suitable material, he mentioned the possibility of the use of some form of rubber compound, a form of which he has been testing for some time, and which shows promise of being successful. His tests had been with hydrochloric acid near the boiling point.

In the course of the discussion, Dr. Voelker, as on the previous occasion, related how he had used powdered leucite and found it equally satisfactory as a fertiliser as ordinary potash, but added that the extended use of this new form of potash in this country would depend entirely upon the price at which it could be sold here.

Dr. W. R. Ormandy suggested the need for some control of the leucite deposits if they were to be of any value in this country. If the supplies were to be available to all countries of the world at the same price on the spot, then those countries nearer to Italy than Great Britain would be able the better to compete with us in selling the products to be made from leucite by reason of the lower freights. He suggested the formation of an international company to work the deposits.

Mr. Norman Swinden referred to the rubber compound which Professor Hinchley said he had been experimenting with, and exhibited a pot used in these experiments. This, he said, consisted of 55 per cent. of rubber, and cost about 1s. 3d. per lb. He severely criticised the rubber industry in this country for not having brought forward a material which would withstand hydrochloric acid, and added that a plant was being put up in London made entirely of this material down to the boiler. The need was for a material which would resist hydrochloric acid up to 110°. The particular material which he had referred to was also useful in lining peculiar shaped vessels used in chemical engineering.

Dr. Lessing, Dr. Seligman and others also took part in the discussion, and Professor Hinchley briefly replied.

Scientists Required for the Antarctic

THE COLONIAL OFFICE is searching for several young men, with scientific qualifications, who are prepared to join a three years' expedition to the Antarctic. Among those required are a chemist, an expert physicist, a surgeon and several zoologists.

Research in Ionamine Dyestuffs

Paper by Professor A. G. Green and Mr. K. H. Saunders

At a joint meeting of the Nottingham Section of the Society of Chemical Industry with the Society of Dyers and Colourists (Midlands Section), on Wednesday, January 30, a paper on "The Progress of Research in the Ionamine Dyestuffs," by A. G. Green, F.R.S., and K. H. Saunders, B.A., B.Sc., was read by Mr. K. H. Saunders.

The fundamental principle of the working of the ionamine dyestuffs was first described, and it was shown how these alkyl omega sulphonates of amino-azo bases were readily hydrolysed in the dyebath producing the amino-azo base and regenerating aldehyde bisulphite. Both acid and alkali were capable of bringing about this hydrolysis, and if cellulose acetate silk was present in the bath, this removed the dye as soon as it was formed so that none became apparent in the solution. The early members of the type ranged from yellow to orange, and the chief advantage of their use was firstly their solubility in water, and, secondly, the fact that they would mix with direct cotton colours producing varied colours with silk-cotton goods. The processes of diazotisation and development (with their attendant difficulties) were necessary, however, to produce deeper shades, and the next step in the research was to find compounds insoluble in water, yet possessing an affinity for cellulose acetate and at the same time containing free amino groups to which alkyl sulphonic groups could be attached so that it would become soluble. The dyeing of cellulose acetate silk was apparently a solution phenomenon, and there was no definite information as to why one compound should have an affinity for the silk whereas an isomer had none at all.

In order to obtain ionamine blue dyestuffs, attempts were made to prepare alkyl omega sulphonates of first the indulines, and, secondly, with the gallocyanines, but it was not until the aminoanthraquinones were used that really successful results were obtained. Blue dyestuffs were thus made which were fast to light and which gave very even penetration owing to a slower hydrolysis. Difficulties occurred in the dyehouse which did not arise in the laboratory; thus it was very necessary to get all the air out of the goods by prolonged heating, and uneven penetration produced the defect of alternate light and dark shades ("barring"). Such difficulties had been overcome, however, and a fairly complete range of ionamine dyestuffs was now available. The ionamine method for dyeing cellulose acetate silk would seem preferable to one involving use of insoluble compounds. These latter were held in colloidal solution by means of a dispersing agent such as turkey red oil, and often waste of colour occurred or else a too small precipitation of the colour. The advantages of the ionamines were (1) their solubility in water; (2) non-precipitation by acids, alkalis, or small concentrations of salts; (3) miscibility in the same bath with direct cotton colours since they are not mutually precipitated. Problems which still awaited solution were the production of cheap blues, homogeneous browns, and a direct black. Another problem to be solved was the preparation of yellow dyes which would not exhibit "phototropy." This latter phenomenon was observed when a portion of a piece of cellulose acetate fabric was shielded from the light for a few minutes and then the shield removed. A lighter patch is seen which quickly darkens to match the surrounding colour. This phototropic effect has also been noticed with other textiles, *e.g.*, fast light yellow woollens, but no explanation has yet been found.

In the course of discussion, Mr. Pomphrey asked whether the ionamine dyed cellulose acetates compared favourably with woollens as regards fastness towards chemicals and stoving.

Mr. Pentecost inquired if the different samples of cellulose acetate varied in composition.

Mr. Wolstenholme referred to instances where some samples assumed a bronzed black, when dyed with Ionamine A Black, while in the same bath other samples were good.

Mr. L. S. Pentecost asked whether the lustre could be restored to a "blinded" fabric.

In reply, Mr. Saunders sated that fastness of the ionamine dyestuffs was very varied with different reagents, and often it was the cellulose acetate silk which was injured first. The variations in colour of different samples in the same dyebath could only be accounted for by difference in composition of the samples. It was not possible to restore the lustre to a blinded fabric. The bronzed effect with Ionamine A Black was probably due to incomplete diazotisation, and a second immersion in the bath would remedy the defect.

The Sir John Cass Technical Institute

Sir W. Bragg on the Applications of Research Work

The annual distribution of prizes was held at the Sir John Cass Technical Institute on Wednesday, January 30, when the prizes and certificates were distributed by Sir William Henry Bragg, K.B.E., F.R.S., Director of the Royal Institution.

The Chairman of the Governing Body, the Rev. J. F. Marr, M.A., in giving a summary of the work of the Institute, stated that a total of 41 students had been successful at the examinations of London University, five of whom obtained the degree of M.Sc. by research carried out at the Institute. Twenty-two students had been engaged in research work during the session, and 17 original investigations had been published, bringing the total number of papers issued from the Institute to 137.

Following the distribution of the awards, Sir William Bragg delivered an address on "Research Work and Its Applications." The address was devoted particularly to the nature and objects of research. Emphasis was laid on the new era of research work marked by magnificent gifts such as those of Sir Alfred Yarrow to the Royal Society, of the Rockefeller Trustees to University College, and by the stimulus given by the Government Departments of Scientific and Industrial Research. Research work, it was pointed out, brought out self-reliance, the faculty of selection and judgment of evidence, and developed a sound study of previous investigations. The valuable faculty of selection was one of the most important lessons to be learnt in connection with research. A good research student was likened to a fire which, on a match being put to it, burned without being touched again.

The research worker should never try to convince others of the value of his work, but leave them to discover this themselves. Those who devoted their time to research were always hoping to add something to human knowledge and to human interest. It was our duty and our gain always to explore, and the spirit of research therefore was something which we should try to foster and incorporate in the nation's life. Concluding, Sir William Bragg said that research was not a religion, but the act of one. It implied a certain faith in the beauty and the purpose of the Universe; that whatever there is in the world was really meant for us to see if only we could see it.

Dehydration of Alcohol With Glycerine

At the last meeting of the Manchester Section of the Society of the Chemical Industry a paper on "The Dehydration of Alcohol by Means of Glycerine," prepared by Professor E. Knecht and E. F. Muller, was read by Professor Knecht. It was well known, he said, that pure glycerine readily took up a certain proportion of water which it retained tenaciously at the boiling point of water and even beyond that temperature. It was considered of interest to ascertain whether this property might be utilised for the dehydration of ordinary alcohol, with a view to working out a rapid and convenient process for the preparation of absolute alcohol. In a preliminary experiment some ordinary alcohol of about 92 per cent. strength was mixed at random with glycerine and distilled from a water bath; pure alcohol came over, though it was fairly obvious that this would be the result. In order to ascertain to what extent pure alcohol was retained by pure glycerine at 100° C. a quantitative distillation was carried out. To this end absolute alcohol was mixed with 25 per cent. of pure glycerine, the mixture being distilled from a water bath and the distillate collected in a flask provided with a loosely fitting cork. The following quantities were taken: 40 g. absolute alcohol, 10 g. pure glycerine. The mixture was distilled until no more liquid came over at the temperature of the water bath and yielded 37·8 g. alcohol recovered, so that 2·2 g. had remained in the glycerine, this being equivalent to 5·5 per cent. of the alcohol taken. By heating the residue in the flask to 180° C. a further recovery of 2·15 g. alcohol was effected, and the loss was practically nil. The method gave a satisfactory product with very little trouble, and in sufficiently good yield to be of some practical value in the laboratory.

A Tribute to Professor Dixon

Bust Unveiled at Manchester University

A BUST of Professor H. B. Dixon, Professor of Chemistry at the Manchester University from 1886 to 1922, was unveiled on Saturday, February 2, in the Chemical Theatre of the University. Many colleagues and past students of Professor Dixon attended the ceremony, which was performed by Dr. Harold G. Colman.

The Vice-Chancellor (Sir Henry Miers) presided. Professor Dixon, he said, had received into his charge thirty-six years ago a chemistry school which was possessed of great traditions. It was appropriate that, in what had been for Professor Dixon the theatre of many triumphs, his bust should look down on the succession of students.

Work on Combustion

Dr. Colman then unveiled the bust, which is in bronze, and the work of Mr. J. Millard, the head of the modelling school of the Manchester Municipal School of Art. Referring to Professor Dixon's work, Dr. Colman said that his work, perhaps more than any other, had gained knowledge of the mechanism of combustion, and had assisted in the development of the internal-combustion engine. Moreover, his study of gases had resulted in a considerable diminution of explosions in coal mines. They wished him many years in which to enjoy his leisure and to pursue research. (Applause.)

Replying, Professor Dixon said it had been his ambition to complete the work of his predecessors, Frankland and Roscoe, and to secure facilities for research. Thirty-six years ago the atmosphere of research was virtually confined to the big German laboratories. It was his conviction—as it had been the conviction of Frankland and Roscoe—that Manchester should not fall behind the great German schools of chemistry, and to that end he had striven in the choosing of colleagues and of staff personnel, and in his yearly battles with the Finance Committee. (Laughter.) Our industries, he proceeded, needed not only recruits with text-book knowledge but recruits with training in methods of research, and his aim had been to turn out not only research pupils but future managing directors, future inventors, and future consulting chemists.

Mr. Norwood Smith, on behalf of the Committee, explained that the number of individual subscribers to the memorial was 240. The sum of £559 5s. 6d. had been subscribed, and about £500 were available for the bursary which it was proposed to found in honour of Professor Dixon. This list of subscribers was not yet closed, and might receive additions in the next fortnight.

The Institute of Metals

THE annual general meeting of the Institute of Metals will be held at the Institution of Mechanical Engineers, Westminster, on Wednesday and Thursday, March 12 and 13, commencing each day at 10.30 a.m. The presidential address will be delivered by Professor T. Turner, M.Sc., A.R.S.M., in the morning of March 12. No fewer than 14 communications—many of a very important character—are due for presentation and discussion. The annual dinner of the Institute will be held at the Trocadero Restaurant on Wednesday, March 12.

In connection with the forthcoming meeting a ballot for the election of members and student members will be taken at noon on February 28. Persons elected as a result of the ballot will have the privilege of membership, not for the usual 12 months, but for the extended period ending June 30, 1925. In addition, new members and students will be entitled to receive an extra copy of the "Journal," making three volumes in all during the period covered by their subscription. Membership application forms and full particulars regarding the Institute can be obtained on application to the Secretary, Mr. G. Shaw Scott, M.Sc., 36, Victoria Street, Westminster, S.W.1.

It is of interest to note, for the first time in the Institute's history, that the membership passed the 1,500 mark on December 31, 1923. It is hoped by the Council that, as a result of the many activities of the Institute during the present year—particularly in connection with the British Empire Exhibition—this figure will be substantially increased before the end of 1924.

Chemical Companies Winding Up

United Laboratories and Chemical Co., Ltd.

MR. JUSTICE EVE in the Companies Winding-up Court on the petition of Mark Webster Jenkinson, of 4 Central Buildings, Westminster, made an Order for the winding-up of the United Laboratories and Chemical Co., Ltd. Counsel for petitioner said he was a judgment creditor for £131 3s. 6d. He was receiver for a debenture holder and obtained judgment in his own name.

Mr. Kingham, for the company, raised the question whether the receiver could present a petition in his own name.

His Lordship said there was no question, but that the receiver was entitled to do so. He had got judgment.

British Potash Co., Ltd.

In the Companies Winding-up Court on Tuesday, Mr. Justice Eve had before him a petition by H.M. Attorney and the Solicitor to H.M. Treasury for an Order to wind up the British Potash Co., Ltd. Mr. Highton Pollock for the Attorney-General, said the petition was presented by him on behalf of the Board of Trade and by the Solicitor to the Treasury as the successor of the Minister of Munitions. The claim was for £55,000. The company did not appear.

His Lordship said he would make the Order and he added: I hope you may get something out of it. How is it that these things were supplied on credit?

Mr. Pollock: There was a good deal done during the war which is inexplicable.

His Lordship: Yes; but here is a company which bought and sold stuff running into thousands of pounds.

Mr. Pollock: And the worst is that when they sold they made a profit.

His Lordship: No wonder we are taxed out of existence.

Affairs of Mr. A. E. Barton

Founder of Cumberland Coal Power and Chemicals, Ltd.

THE public examination was held on Wednesday, January 30, before Mr. Registrar Hope, at the London Bankruptcy Court, of Mr. Alfred Ernest Barton, described as of Grosvenor Place, London, and the Villa Vera, San Remo. The accounts showed total liabilities £110,802 and a deficiency estimated at £34,769.

Replying to Mr. Waterer, Official Receiver, the debtor stated that from 1893 to 1897 he was engaged in prospecting and pegging mining claims in South Africa and Western Australia. In the latter year he came to this country and had since been engaged in the promotion and direction of various mining companies. His efforts were successful, and at the end of 1918 he had a fortune of between £80,000 and £100,000.

In February, 1919, he formed the Cumberland Coal Power and Chemicals, Ltd., with a nominal capital of £250,000, to acquire collieries in Cumberland and the British rights in the Claude synthetic ammonia process. Unfortunately, it was rumoured that the sanction of the Treasury to the formation would not be given, and in order to proceed with the registration he paid in full for 43,100 £1 shares and 6d. each on a further block of 34,593 shares, which carried a heavy liability.

The Official Receiver: Why did you lock up all your fortune in one company. Do you not think it was a rash act?

The debtor replied that he looked upon the company as a very good business proposition which would still further increase his fortune. His faith in it was so great that he also put £10,000 of his wife's money in it. The company, however, was unsuccessful and went into liquidation in December, 1922. It had a year previously entered into a contract to purchase the Tyssee Power Company of Norway for £600,000 and paid a deposit of £200,000, which was forfeited because the purchase was not completed owing to the financial collapse that set in about that time.

The examination was concluded.

Substitutes for Cocaine

THE Royal Society of Medicine will hold a special discussion on "The Possible Substitutes for Cocaine," in the Robert Barnes Hall, Wimpole Street, London, on March 12, at 5 p.m. Dr. H. H. Dale, F.R.S., will open the discussion, and other speakers will include Professor W. E. Dixon, F.R.S., Sir Maurice Craig, and Dr. Percy Smith.

The Policy of the Government

In view of the appointment of Dr. Sidney Webb, the inspirer of most of the modern Socialistic thought, as President of the Board of Trade, the following extracts from his recent writings will be of interest to students of the political and industrial situation.

"The process of distribution developed by the profiteering system might more fitly be described as an elaborate system of interception and blackmail."

* * *

"All the facts of modern industry prove conclusively that the competitive management of property invested in industrial enterprise, and its management in detail by individual owners, leads to hopeless inefficiency."

* * *

"It was, in fact, British commercialism that prepared the moral conscience of mankind for the German theory of world power."

* * *

"History will regard capitalism, not as an epoch, but as an episode, and in the main a tragic episode, or Dark Age, between two epochs."

* * *

"The Labour and Socialist movement of the world is essentially a revolt against the capitalist system of society."

* * *

"The primary purpose of the Socialist is to focus attention on the peculiar kind of tyranny now exercised . . . by a relatively small class of rich men over a mass of poor men."

* * *

"The making of pecuniary profit has proved to be a socially injurious and even a dangerous stimulus to activity."

* * *

"It is therefore clear that a nation, in deciding to establish or to continue the private ownership of land and capital as the basis of the industrial organisation of its people, deliberately chooses inequality."

* * *

"The worst circumstance of capitalism is, however, neither the property of the wage-earner nor the luxury of the property owner, but the glaring inequality in personal freedom between the property-less man and the member of the class that 'lives by owning.' . . . That is what is meant by the wage-earners when they complain of 'wage-slavery.' The Socialist believes that the very basis of the capitalist system is scientifically unsound."

* * *

"The most glaring instance of the capitalist direction of our mentality and perhaps, ultimately, the most pernicious, is the modern system of ownership of the newspaper press."

* * *

"It has been reserved for the century of capitalism to produce an extensive class of persons, absolved from productive work, of whom a large proportion of the men, and nearly all the women, have no specific function, and disclaim the obligation of any social service whatever."

* * *

"The modern capitalist profit-makers, by eliminating the simple freedom of competition, have confronted the community with a false alternative. '. . . Either the trusts will own the nation or the nation must own the trusts."

* * *

"It is unnecessary to dwell in greater detail upon the poverty of the poor as the most obvious evil result of the 'free enterprise' of the profit-making capitalist."

* * *

"The middlemen become masters of the situation. They will not allow the producers and shopkeepers to compete and thus fix prices by the old higgling of the market. . . . They fix prices themselves with an eye to their own profit. . . . Thus arises the paradox . . . increased competition means increased cost of selling, and this has to be added to the price charged to the consumer. The greater the competition, the higher becomes the retail price."

* * *

"The capitalist has to pay the whole cost of the machine and even more, whilst the human instrument, though much more costly to produce, can be had for nothing . . . his only expense being the bare cost of maintaining his power of working from week to week."

The Corporation Profits Tax

Reasons Why It Should Go

THE question as to how the first Labour Budget will deal with the Corporation Profits Tax is exciting much interest. There is reason to think that the Labour Party is as alive as other parties to the injustice of a tax which hits at commercial expansion and consequently is a factor in unemployment. Business men of all kinds have individually and collectively through the Federation of British Industries and other trade associations registered emphatic protests against the tax. There are several reasons against its continuance: It is inequitable in its operation; it is a hindrance to trade development; it was introduced originally merely as a temporary expedient to balance the Budget of 1920; for its continuance no reason can be given and many reasons can be advanced for its withdrawal.

The conscience of the Treasury was apparently pricked last year, when the tax was reduced from one shilling to sixpence. The full effect of the reduction will not be felt until next year, for in the 1923-4 Budget the Chancellor of the Exchequer estimated the yield to be £20,000,000, when the tax was sixpence, against £19,750,000 in the previous financial year, when the tax was one shilling. But to lessen an evil by half is no remedy; it is merely a weak compromise. The whole tax must be abolished.

The incidence of the Corporation Profits Tax is ridiculous. It is charged only on limited liability companies, and a firm of a private character, whose business is conducted exactly on the same lines and which has exactly the same competition to meet, escapes this 2½ per cent. imposition on its profits. Compared with the magnitude of its operations the tax has produced very small results, and is a dwindling source of revenue. The time is ripe, therefore, for admitting that its imposition was a blunder and for getting rid of it.

The New "Electrician" Directory

THE "*Electrician*" *Electrical Trades' Directory and Handbook* (the well known Blue Book) hardly requires any detailed description after forty-two years of existence. It is enough to say that it is essential to everyone connected with the electrical industry who does any correspondence or buying or selling. If he is interested in professors it tells him who and where they are. If he wants to buy enamelled wire it tells him where it is to be got. If he wants to sell cookers it tells him who are the most likely prospects. In addition there is a vast amount of useful technical and commercial information about the electrical industry, all of which has been carefully brought up to date in the latest edition. Among the new matters dealt with this year may be mentioned the revised cinematograph regulations of the Home Office, particulars of the British Broadcasting Company's service and licensing regulations, and an account of the progress which has been made by the Electrical Commissioners in organising the electricity supply of the country. The *Directory* is published by Benn Brothers, Ltd., 8, Bouverie Street, London, E.C.4, at 25s. net.

The Work of the Optical Society

THE annual meeting of the Optical Society was held on January 31, and the report of the Council for the year presented. The report states that during the year nine meetings were held, in the Imperial College of Science and Technology, London. Among other activities chronicled, in conjunction with the Physical Society of London, the thirteenth annual exhibition of electrical, optical and other physical apparatus was held at the Imperial College of Science and Technology on January 3 and 4, and as in previous years was largely attended. During the year members were invited by the Board of the Institute of Physics to the series of lectures on "Physics in Industry" which were introduced with success. It has been decided that some of the Ordinary Meetings of the Society may be held at 5 p.m. instead of 7.30 p.m., when the matters dealt with are of purely scientific or mathematical nature not likely to be of interest to trade members.

From Week to Week

BILLS for the removal of the import duty on calcium arsenate have been introduced before the U.S. House of Representatives.

AN INVENTOR at Darlington claims to have found a process for making an inflammable gas for power and lighting by the mixing of steam and oil.

THE DEATH TOOK PLACE in Glasgow, on Thursday, January 31, of Mr. William Ewing Gilmour, of Sutherland, late director of the United Turkey Red Co.

MR. R. G. W. NORRISH, B.A., of Emmanuel College, Cambridge, has been awarded a prize of £30 from the Gordon Wigan Fund for research in chemistry.

THROUGH USING a naked light to examine a tank of creosote, a fire was caused at Withnell Brickworks, resulting in the death of one man and serious injuries to another.

AN EXPLOSION in the carbon bisulphide plant at the Wigg Works, Runcorn, of the United Alkali Co., resulted, on Saturday February 2, in the death from burns of an employee engaged on the plant.

A VALUABLE PICTURE, which belonged to the late Dr. Muspratt, of Seaforth Hall, has been presented by his daughter, Mrs. Solly, to Waterloo-with-Seaforth Urban District Council, to be hung in the Town Hall, Waterloo.

MR. F. J. W. ROUGHTON, B.A., of Trinity College, Cambridge, has been appointed University Lecturer in Bio-Chemistry, and Dr. J. F. Crowther, of the Cavendish Laboratory, has been co-opted a member of the Degree Committee of the Special Board of Physics and Chemistry.

PROFESSOR BURSTALL, at Birmingham University, in describing the changes that science will bring about in 200 years, stated that carbon-dioxide would be extracted from the higher atmosphere, subjected to catalytic processes and united to water to form alcohol, which would be drawn off at the bottom of the collecting towers.

AT A MEETING of the Manchester Literary and Philosophical Society on Tuesday a paper on "Crystal Structure" was given by Sir William Bragg, F.R.S. He remarked that the attention of scientists investigating atomic phenomena was now being turned to crystals instead of gases, which were formerly the only state of matter about which anything definite was known.

THE GAS SUB-COMMITTEE on Smokeless Fuel, of the Glasgow Corporation, agreed on Monday to proceed immediately with the installation of a 5-unit battery of Maclaurin producers for the manufacture of smokeless fuel at Dalmarnock Gas Works. By this process some new and interesting by-products are likely to be evolved, and these will be treated in the chemical section of the gas department.

THE COMMERCIAL SECRETARY for Brazil (Mr. E. Hambloch) has secured new office premises in the centre of the business district of Rio de Janeiro, in the thoroughfare in which the British Consulate-General is situated. The new address, to which all communications should in future be addressed, is announced by the Department of Overseas Trade as Avenida Rio Branco, No. 37, Rio de Janeiro.

A VERY STRIKING POLYCHROMATIC DESIGN has been chosen by E. G. Sawyer and Co., of Dominion House, Fenchurch Street, London, for a wall calendar. The silhouette of a modern factory is shown against a sunset represented in the futurist style, while the chimneys belch forth a dark-blue cloud of smoke of curious and artistic formation. In this cloud attention is drawn to the firm's goods by the single word "dyestuffs."

THE NUMBER OF PERSONS on January 28, 1924, recorded on the live registers of the employment exchanges in Great Britain was 1,284,700. This was 69,019 more than on January 21, 1924, but 201,178 less than the figure recorded on January 1, 1923. The increase was due to the temporary discharge or suspension of workpeople on account of the railway dispute. The total included 961,600 men, 42,900 boys, 240,400 women, and 39,800 girls.

THE LANCASTER TOWN COUNCIL, on Wednesday, January 30, decided to protest, through the local Member of Parliament, to the Government Department concerned against the conveying of material affected by poison gas from a Government factory at Ellesmere Port to Glasson Dock. The Council feels that there is no necessity to bring the material to Glasson, a distance of 86 miles, and asks if it has to be "dumped" in the sea, why it should not be put on board at Ellesmere Port.

INABILITY TO OBTAIN economic transport during the railway strike led to a partial suspension of work at a fertiliser factory at Plymouth. The artificial manure season had just begun and plenty of orders from farmers were on hand, but it was impossible to execute these in consequence of the lack of railway facilities. Road motor transport has been utilised to some extent, but the loads are very large, the customers scattered over a wide area, and the cost of such transport prohibitive for general use.

LEAD POISONING was the reason given for a claim made under the Workmen's Compensation Act before Judge Cluer at Shoreditch County Court on Friday, February 1. The claimant was a carpenter, and when engaged in fitting window sashes his hands had become covered with wet paint. The index finger of the right hand became poisoned and had to be amputated. Owing to the difficulty of showing the connection between the paint and the poisoning of the finger claimant was persuaded to accept an offer of £50 with costs.

IN A LECTURE on "Coal in the Light of Recent Research," by Professor Henry Briggs, D.Sc., at the Heriot-Watt College, Edinburgh, on Saturday, February 1, attention was directed to the formation of anthracite. Recent evidence showed that it was composed of exactly the same kind of remains as in bituminous coal, but that it had undergone dynamic metamorphism as a result of compressional thrust. The pressure which had produced the change was estimated at about 12 tons per sq. in. in the case of South Wales anthracite.

THE MEDICAL RESEARCH COUNCIL published on Thursday, January 31, a report on an investigation which has been taking place in certain Yorkshire glass factories regarding the conditions and methods of production best suited to the workers. It has been found that the eight-hour shift is an improvement over the ten-hour shift, as the worker gives a consistently increased hourly output rate, accompanied by a decrease in the amount of spoilt work. The same conclusions have been arrived at in both the tinplate and steel industries.

DR. ALFRED REE, the vice-president of the Manchester Chamber of Commerce, chairman of the Testing House Executive Committee of the Chamber, and for many years a well-known figure in connection with the Chemical and Allied Trades Section, will probably succeed Mr. W. Clare Lees as president of the Chamber at the annual meeting next week. Dr. Ree is a retired chemical manufacturer of Manchester, a prominent member of the Society of Chemical Industry and other professional bodies, and took an active part some years ago in the pioneer work which led to the formation of the British Association of Chemists.

PROFESSOR FORSYTH J. WILSON, of the Royal Technical College, lectured to the Royal Philosophical Society of Glasgow on Wednesday, January 30, on "Some Historical Aspects of Chemistry." After referring briefly to some of the chemical arts practised by the ancient Egyptians and the alchemists of the Middle Ages, the lecturer said that in the sixteenth century chemistry received an impulse in a new direction, the preparation of medicines and of substances useful to arts. It was shown how chemistry was gradually freed from the mysticism and absurdities of the earlier period and the ground cleared for the developments of a scientific study of chemistry.

THE MANCHESTER CITY CORONER (Mr. C. W. W. Surridge), on Monday, February 4, opened an inquiry into the circumstances attending the death of Alfred Bamford, aged 16, of Oldham Road, Miles Platting, Manchester. Bamford was employed at the bleaching and dyeing works of Jackson and Co., Crumpsall, Manchester, and on January 30 was overcome by fumes whilst working in a dye vat. Another man who was with Bamford was also affected, as was also a third workman who went to their assistance. The last man, however, was able to scramble out of the vat and raise the alarm. Bamford was dead when admitted to hospital, whilst the other men were detained there as in-patients. The Coroner adjourned the inquiry until they were well enough to give evidence.

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How chemistry helps to solve livestock problems. J. R. Mohler. *Chem. Age* (*N. York*), December, 1923, pp. 569–571.

DOLOMITE.—The dead burning of dolomite. Part I. J. T. Robson and J. R. Withrow. *J. Amer. Cer. Soc.*, January, 1924, pp. 60–73.

French

SPECTROSCOPY.—Practical methods of spectro-analysis for the identification of the elements. A. de Gramont. *Bull. Soc. Chim.*, December, 1923, pp. 1693–1731.

ELECTRO-CHEMISTRY.—Study of the electrolytic preparation of ammonium persulphate. J. Salauze. *Bull. Soc. Chim.*, December, 1923, pp. 1738–1761.

CHLORINATION.—Investigations relating to the chlorination of carbon chains. Chlorination of normal butyl alcohol. H. Gault and R. Guillemet. *Bull. Soc. Chim.*, December, 1923, pp. 1792–1801.

OXIDATION.—The sulpho-chromic oxidation of coal. L.-J. Simon. *Compt. rend.*, January 28, 1924, pp. 495–498.

The oxidation of uric acid with iodine in an alkaline medium. J. More. *Compt. rend.*, January 28, 1924, pp. 498–501.

URANIUM COMPOUNDS.—Preparation and properties of some organic uranium compounds, particularly uranium benzoates and salicylates. The stability of the solutions of some organic uranium compounds in the dark and when exposed to light. G. Courtois. *Bull. Soc. Chim.*, December, 1923, pp. 1761–1785.

REACTIONS.—The action of phosphorus halides on some aromatic amines. M. Bourneuf. *Bull Soc. Chim.*, December, 1923, pp. 1808–1823.

HALOGEN COMPOUNDS.—Investigation of the chloro-sulphides of carbon; decomposition in presence of iron. M. Delépine and J. Giron. *Bull. Soc. Chim.*, December, 1923, pp. 1785–1792.

ACIDS.—The constitution of phthalonic acid. M. Cornillot. *Compt. rend.*, January 28, 1924, pp. 490–492.

The manufacture of sulphuric acid by the contact process. Part XX. Different types of absorbers. H. Braidy. *L'Ind. Chim.*, January, 1924, pp. 2–5.

AMMONIA.—A comparison between the different methods for the direct synthesis of ammonia. Part I. Haber process. P. Firmin. *L'Ind. Chim.*, January, 1924, pp. 6–10.

OILS.—Linseed oil and its applications. Part II. Extraction of the oil by expression (*contd.*). H. de la Condamine. *L'Ind. Chim.*, January, 1924, pp. 10–12.

WOOD.—The carbonisation and distillation of wood. Part I. P. Razous. *L'Ind. Chim.*, January, 1924, pp. 12–14.

German

HYDROGENATION.—The catalytic hydrogenation of some unsaturated compounds, particularly oils, using nickel at room temperature. M. Tanaka. *Chem. Zeit.*, January 12, 1924, pp. 25–26.

ANALYSIS.—Technical methods for the estimation of molybdenum. O. Binder. *Chem. Zeit.*, January 19, 1924, pp. 37–38.

Thermal analysis of sodium sulphide. E. Benesch. *Chem. Zeit.*, January 23, 1924, pp. 43–44.

INKS.—The primary ink-forming salts in iron inks. G. Vieli, G. Lilljeqvist and A. Loosli. *Annalen*, January 18, 1924, pp. 233–264.

OXIDATION.—The oxidation of aliphatic amines. S. Goldschmidt and V. Voeth. *Annalen*, January 18, 1924, pp. 265–277.

Patent Literature

Abstracts of Complete Specifications

208,685. CARBOHYDRATE ESTERS, PROCESS OF MANUFACTURING. Soc. de Stearinerie et Savonnerie de Lyon, 58, Chemin de Gerland, Lyons, France. International Convention date, December 21, 1922.

The object is to prepare esters by the direct treatment of carbohydrates, particularly starch, with acid chlorides of the higher fatty acids—*i.e.*, those containing more than 5 atoms of carbon. The components are mixed together in chloroform, carbon tetrachloride, halogen derivatives of acetylene, benzene, etc., and condensing agents such as pyridine, quinoline, etc. The process is completed by gradually raising the temperature. These carbohydrate esters are amorphous substances which are non-inflammable and odourless. They are soluble in chloroform, halogen derivatives of acetylene, carbon tetrachloride, benzene, etc., and the solutions may be employed in the manufacture of plastic material, coatings, varnishes, papers, leathers, films, etc., the results being similar to those obtained with cellulose acetate or nitrate.

208,832. ALKALI SULPHIDES FROM THIOSULPHATES, MANUFACTURE OF. W. J. Mellersh-Jackson, London. From the Koppers Co., 800, Union Arcade Building, Pittsburg, Pa., U.S.A. Application date, October 3, 1922.

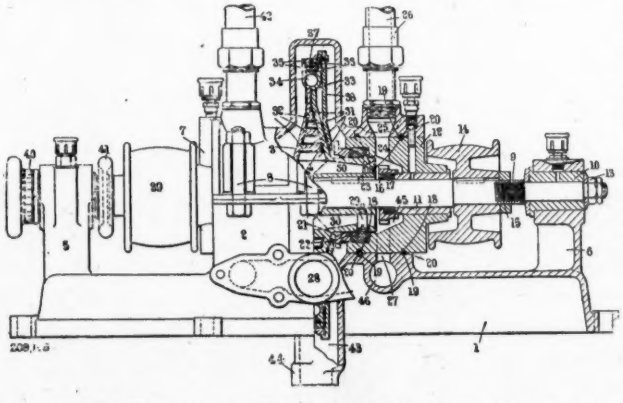
Sodium thiosulphate is obtained as a secondary product in the purification of gas by washing with sodium carbonate solution as described in Specification No. 209,169 (see below). The sodium thiosulphate crystals, after separation, are mixed with carbonaceous material, such as coal, charcoal or coke, and heated in a furnace to 900° C. The crystals are preferably first dehydrated and the proportion of coal is about 25-50 per cent. The product is leached with water, yielding sodium sulphide solution containing some sodium carbonate, which may be separated in any known manner.

209,124. DETINNING OF TINNED IRON SCRAP. H. Davies, 6, Featherstone Buildings, High Holborn, London, W.C.1, and M. A. Adam, 57-58, Lincoln's Inn Fields, London, W.C.2. Application date, July 5, 1922.

The tin is extracted from tinned iron scrap by means of a solution containing iron and tin chlorides. Chlorine is supplied to this solution containing the iron scrap, and is rapidly absorbed. The chlorine acts directly on the scrap, and also by increasing the proportion of stannic chloride. A small proportion of hydrochloric acid is also added. The concentration of stannic chloride in the solution may be varied by varying the supply of chlorine, and may be increased or decreased within wide limits.

209,135. DISINTEGRATING OR EMULSIFYING MATERIALS, MACHINES FOR. H. Povey, 24, Wolverton Road, Stanmore, Middlesex. Application date, September 4, 1922.

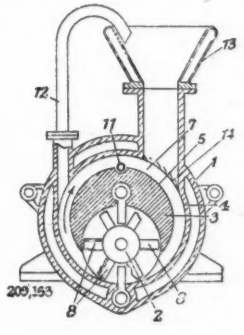
This apparatus contains two rotatable members 3, 4, mounted on separate coaxial shafts which are driven by



means of pulleys 39, 14. The material to be treated is supplied through pipes 26, 42, passage 24, and axial ducts 30 into the space between the members 3, 4. The member 4 carries rings of blades 31, which intermesh with rings of blades 32. The material then passes outwards through a narrow annular duct 33 to an annular chamber 34, and then to another series of intermeshing annular projections 35, 36, having holes 37 at intervals to allow the material to pass through when the holes register with one another during the rotation of the member 3, 4. Leakage of material through the clearance space between the projections 35, 36 is prevented by an annular plate 38 carried by the member 3. Any material passing through into the trough formed by the plate 38 prevents any further leakage by means of its centrifugal pressure. The material is very finely divided by means of the rotation of the members 3, 4 in opposite directions at 3,000 revolutions per minute, and the material is discharged intermittently through the holes 37 when they are in register, and a finer state of subdivision is obtained by this means. Suitable means for preventing leakage from the apparatus are employed, such as stuffing glands 22, 17. The clearance between the blades 31, 32 is 1/64th of an inch, and the width of the annular duct 33 is 0·006 inch, and thirty-two holes 37, of 1/16th inch in diameter, are provided in one example. A mixture of solid and liquid treated in this machine yielded a product which showed no settling out of the solid particles after standing for several weeks.

209,163. DISINTEGRATORS. Plauson's (Parent Co.), Ltd., 17, Waterloo Place, Pall Mall, London, S.W.1. From H. Plauson, 26, Jarrestrasse, Hamburg, Germany. Application date, October 3, 1922.

This disintegrator is for the purpose of producing colloidal dispersions. The disintegrating device 2 carrying a series of blades 8 is mounted eccentrically in the casing 1, and its upper portion is surrounded by a concentric member 3, leaving an annular space 7 between it and the inner wall 4 of

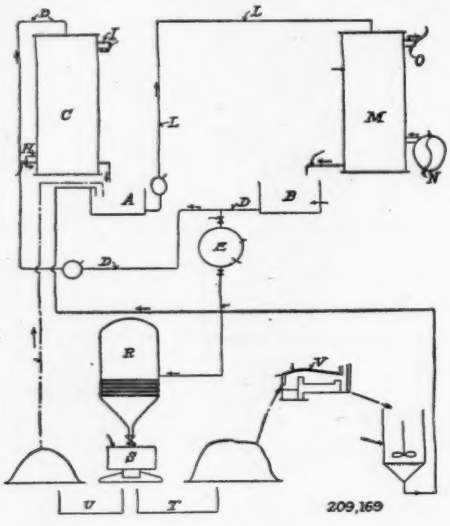


the casing. The upper part of the annular space 7 contains a series of transverse walls forming compartments, each of which corresponds to one of the rings of vanes or beaters 8. Liquid is introduced at the upper end of the casing into the outermost of the compartments formed by the transverse walls, and is carried round the annular space 7, and gradually passed on by the beaters 8 until it reaches the discharge pipe 11 on the opposite side of the apparatus. In treating some substances, large quantities of froth are formed, and the froth is removed by a tangential pipe 12 and delivered into a funnel 13 which returns the material to the apparatus. The beaters may be smooth for dealing with hard mineral substances, or may be shaped like knives for dealing with fibrous material.

209,169. REMOVAL OF HYDROGEN SULPHIDE FROM GASES. W. J. Mellersh-Jackson, London. From Koppers Co., 800, Union Arcade Building, Pittsburg, Pa., U.S.A. Application date, October 3, 1922.

The apparatus is for removing hydrogen sulphide from gases by means of alkali, and for concurrently regenerating the liquid by means of air, and regenerating the thiosulphate formed as a secondary product of aeration. The process is applicable for purifying coke oven gas, water gas, etc., which usually contains carbon dioxide. If carbon dioxide is not present it may be added to the gases. When sodium carbonate solution is treated with carbon dioxide and hydrogen sulphide

a mixture of sodium bicarbonate and sodium hydrosulphide is formed. When these are aerated, sodium carbonate is reproduced, but part of the sodium hydrosulphide is converted into sodium thiosulphate. In this invention, the latter is reconverted into sodium sulphide, which hydrolyses into sodium



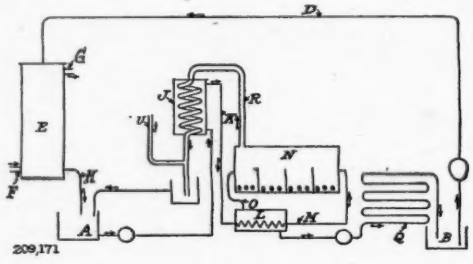
hydrosulphide and sodium hydroxide, which may be used again for treating the gas by returning it to the system. In a modification, the sodium thiosulphate is converted principally into sodium carbonate.

The process is started with a solution containing 3–5 per cent. of sodium carbonate which is pumped from a tank B through a pipe D to a "benzol scrubber" C, though which the gas to be purified passes from H to I. The liquor is received in a tank A, and pumped through a pipe L to an aerating tower M, which may be similar to the scrubber C; air may be blown through it by a fan N, and the hydrogen sulphide passing out through the pipe O may be disposed of as desired. The aerated solution containing thiosulphate is returned to the circulating tank B. Part of the solution is periodically withdrawn to the tank E, and replaced by thiosulphate solution which has been regenerated. This solution is evaporated in an apparatus R until the boiling point reaches 120° C. when the bicarbonate is converted into carbonate, and 80–90 per cent. of it is deposited. The carbonate is extracted in a centrifuge S and the thiosulphate solution crystallised in a tank T. The thiosulphate crystals are first dehydrated, and then converted into sodium sulphide by heating in a furnace V with coal as described in Specification No. 208,832 (see above). The resulting solution is returned to the system, together with the sodium carbonate from the evaporator R. Alternatively the sodium thiosulphate crystals may be heated with coal and limestone to 1,000° C., to obtain sodium carbonate.

209,171. Hydrogen Sulphide, Manufacture of. W. J. Mellersh-Jackson, London. From the Koppers Co., 800, Union Arcade Building, Pittsburg, Pa., U.S.A. Application date, October 3, 1922.

The object is to obtain pure or concentrated hydrogen sulphide from gases which contain it, but no ammonia and a small proportion of carbon dioxide. Such gases are produced in the distillation and cracking of petroleum, which may contain 5 per cent. of hydrogen sulphide. The process consists in passing the gas through a non-volatile alkali metal sulphide solution which absorbs the hydrogen sulphide. Hydrosulphide is thus formed, which is readily converted back to the sulphide, so that the process may be continuous. The hydrogen sulphide is recovered by heating the solution under vacuum or by passing air or other gas through it.

A solution containing 10 per cent. of sodium sulphide is pumped from a tank B through a pipe D to a gas scrubber E, where it meets the gas—*e.g.*, petroleum distillate gas, which passes through from F to G. The solution passes through the pipe H to the tank A, from which it is pumped to a heat exchanger and condenser J. This is heated by vapour from the heater N, and the partly pre-heated solution passes through a pipe K to a heat exchanger L, in which it is further heated by the hot liquid from the heater N. The latter is heated by steam, either direct or by means of coils, and the vapour and hydrogen sulphide pass through a pipe R to the condenser J. The hydrogen sulphide gas is drawn off through the pipe U. The regenerated sodium sulphide solution is pumped through a cooler Q back to the tank B for use again.



209,270. Lithopone Products and Process of Making the Same. J. L. Mitchell, 17, West 108th Street, Manhattan, New York. Application date, December 11, 1922.

Lithopone (a mixture of barium sulphate and zinc sulphide) has been found unsuitable as a pigment in paint for exterior use owing to the fact that the zinc sulphide becomes oxidised to the soluble zinc sulphate, which causes disintegration of the paint. The object is to obtain a lithopone which avoids this disadvantage, and which may be used as permanent white pigment for exterior paints. This is done by treating the lithopone before calcination so as to produce an insoluble protective coating on its particles. The precipitate of barium sulphate and zinc sulphide is heated and quenched in an aqueous solution of barium sulphide, instead of in water. The material is then calcined, so that the barium sulphide which coats the particles is converted into the insoluble barium sulphate. The lithopone is preferably agitated in the solution, and the solid material is pressed to remove excess of liquid prior to calcination. The calcination is effected in a muffle furnace at a temperature of about 700° C., and the resulting pigment is discharged into a dry cooling chamber without quenching, and is then ground. The lithopone thus obtained has a much greater density and greater refractive index, and the zinc sulphide is protected from oxidation.

Note.—Abstracts of the following specifications which are now accepted appeared in The Chemical Age when they became open to inspection under the International Convention:—190,115–6 (Koppers Co.), relating to removal of hydrogen sulphide from gases and liquids, see Vol. VIII, pp. 152–3; 190,117 and 190,119 (Koppers Co.), relating to the purification of gases, see Vol. VIII, pp. 153, 182; 190,118 (Koppers Co.), relating to manufacture of hydrogen sulphide, see Vol. VIII, p. 153; 192,033 (Texas Gulf Sulphur Co., Inc.), relating to the burning of sulphur, see Vol. VIII, p. 317; 193,029 (A. Rialland), relating to a process for purifying mineral oils, see Vol. VIII, p. 433; 197,329 (A. R. de Vains), relating to neutralisation of the hydrochloric acid formed by the chlorination of cellulosic materials, to obtain cellulose, see Vol. IX, p. 46.

International Specifications not yet Accepted

207,790–1–2. Condensation Products. L. Deutsch, 7, Pyrkergasse, Vienna, I. Thorn, 15, Anzengruberstrasse, Vienna, and Amalith Chemische Industrie Ges., 10, Prinz Eugenstrasse, Vienna. International Convention date, November 30, 1922.

207,790. Phenol-aldehyde condensation products are hardened in a bottomless mould immersed in a salt solution, or a fusible alloy such as Wood's metal or Rose's metal, having a specific gravity higher than that of the mass to be hardened. The mould is covered by a lighter liquid or fused solid such as oil, paraffin, naphthalene, etc.

207,791. To obtain light-coloured, infusible and insoluble condensation products of phenols and aldehydes with caustic alkalis or alkali carbonates the initial product is treated with aromatic carboxylic acids or their alkali metal salts before hardening. Other products such as cyclic hydrocarbons, mono- or polyhydric alcohols, abietic acid or natural resins may also be incorporated. In an example, the product is obtained from phenol, formaldehyde, sodium carbonate, and benzoic acid, or a mixture of sodium benzoate and sodium salicylate.

207,792. This process is similar to that described in 207,791 (above), except that phosphates or borates are added to the original mixture of phenol, aldehyde, and alkali, or alternatively, the initial product may be mixed with phosphoric or boric acid, preferably adding also a weak acid before hardening. In one example the product comprises phenol, formaldehyde, sodium carbonate, sodium phosphate and lactic acid, and in another case phenol, formaldehyde, sodium carbonate, borax, and glacial acetic acid.

207,801. ELECTROLYSIS. P. Reinhardt et Cie., 15, Spessartstrasse, Wilmersdorf, Berlin. International Convention date, November 28, 1922.

Diaphragms suitable for use with neutral and alkaline electrolytes are made by spreading a mixture of cement and sodium chloride or sulphur, moistened with concentrated sodium chloride solution to a depth of 2 mm. over an iron wire netting which has been oxidised by heating in a current of steam.

207,830. HYDROCYANIC ACID. Deutsche Gold-und Silber-Scheideanstalt vorm Roessler, Frankfurt-on-Main, Germany. International Convention date, December 2, 1922.

Hydrocyanic acid is made by the interaction of ammonia gas and carbon monoxide in the presence of highly absorbent catalysts such as activated carbon. This catalyst may be mixed with other catalysts such as metals and metal oxides, or it may form a coating on an inert carrier. Metal oxides alone may be used on a carrier of pumice, asbestos, or wood charcoal. The oxides should not be readily reducible, or if reducible, *e.g.*, iron oxide, they should be protected from reduction by adding alkali or alkaline earth oxides or alumina. The gases after treatment are rapidly cooled by reducing the pressure and by external cooling.

LATEST NOTIFICATIONS.

210,388. Heat treated zirconium-steel, and process of making same. Electro-Metallurgical Co. January 25, 1923.

210,395. Process and apparatus for separating volatile ingredients from mixtures and liquids and for effecting chemical and/or physical reactions. Naamlooze Vennootschap Koninkijke Stearine Kaarsenfabriek Gouda. January 27, 1923.

210,399. Manufacture of fertilisers. Soc. Chimique de la Grande Paroisse (Azote et Produits Chimiques). January 24, 1923.

210,413. Manufacture of intermediate products of the anthraquinone and anthracene series, and dyestuffs therefrom. Soc. of Chemical Industry in Basle. January 24, 1923.

210,416. Apparatus for drying, cooling, and moistening starch, dextrine, and the like. Dextrin Automat Ges. January 27, 1923.

210,432. Process for de-hydrating alcohol. Verola, R., Baron, C., Verley, A., and Urban, E. January 23, 1923.

210,434. Process for obtaining sulphurets from alkaline metals. Soc. Nationale d'Industrie Chimique en Belgique Soc. Anon. January 23, 1923.

210,462. Process of producing on the fibre azo-dyestuffs from arylamides of 2 : 3 oxynapththoic acid. Chemische Fabrik Griesheim-Elektron. January 29, 1923.

210,463. Manufacture of disazo-dyestuffs. Durand and Huguenin Akt.-Ges. January 29, 1923.

210,465. Manufacture of a thionaphthisatin and its intermediate products. Soc. of Chemical Industrie in Basle. January 29, 1923.

Specifications Accepted, with Date of Application

187,601. Agglomeration of Ore, Process for. F. L. Smidth and Co. October 20, 1921.

191,005. Absorbing gases or vapours by means of charcoal, Apparatus for. Farbwerke vorm. Meister, Lucius and Brünnig. December 30, 1921. Addition to 187,223.

192,040. Low temperature carbonisation of solid fuels, carbonaceous material and the like, Process and plant for. W. C, White. January 18, 1922.

195,048. Aluminium alloys. Aluminium Co. of America. March 18, 1922.

199,025. Pulverulent catalyst for the synthesis of ammonia, Process for the manufacture of. C. Urfer. June 12, 1922.

202,279. Zirconium steel and process of making same. Electro Metallurgical Co. August 11, 1922.

205,813. Alcohol and yeast, Manufacture of. E. Klein. August 29, 1922.

209,480 and 210,033. Titanium compounds. C. Weizmann and J. Blumenfeld. July 12, 1922.

208,155. Chlorinating benzine, Process for. Farbwerke vorm. Meister, Lucius, and Brüning. December 5, 1922.

209,849. Cellulose esters, Treatment of—for dyeing. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) October 21, 1922.

209,857. Grinding, crushing, mixing and like mills. C. J. Seaman and Brinjes and Goodwin, Ltd. October 24, 1922.

209,885 and 209,887. Yellow colouring matter of the pyrazolone series. L. B. Holliday and Co., Ltd., and A. Clayton. November 17, 1922.

209,947. Filters. F. P. Candy. January 25, 1923.

209,955. Producer for gasifying bituminous and other fuels with high volatile contents. C. H. V. Baskerville. January 30, 1923.

209,975. Metallic alloy. H. R. Padmore, S. H. Padmore, and J. L. Padmore. February 22, 1923.

210,006. Dyestuffs of indigo tint, Manufacture of. Soc. of Chemical Industry in Basle. March 30, 1923. Addition to 199,360.

210,011. Lead-zinc sulphide ores, mattes and the like, Treatment of. E. A. Ashcroft. June 2, 1923.

210,023. Centrifugal machine for the production of emulsions, colloidal solutions and the like. T. F. Westenholz and J. E. Nyrop. July 17, 1923.

Applications for Patents

Black, A. G. Extraction of oils, spirit and gases from pelionite shale, etc. 2,487. January 30.

Chemical and Metallurgical Corporation, Ltd., and Smith, S. C. Treatment of ores, etc., containing zinc. 2,376. January 29.

Chemical and Metallurgical Corporation, Ltd., and Smith, B. S. Treatment of lead chloride, etc. 2,472. January 30.

Chemische Fabrik Griesheim-Elektron. Process of producing on the fibre azo-dyestuffs from arylamides of 2 : 3 oxynaphthoic acid. 2,377. January 29. (Germany, January 22, 1923.)

Chemische Fabrik Grünau Landshoff and Meyer Akt.-Ges. Manufacture of cast and moulded articles from borates, etc. 2,255. January 28. (Germany, February 12, 1923.)

Chemosan Akt.-Ges. Production of solutions of mercury derivatives hydroxybenzenesulphonic acids, etc., for therapeutics. 2,276. January 28. (Austria, April 30, 1923.)

Coke, B. E., and Maxted, E. B. Manufacture of phthalimide. 2,713. February 2.

Courtaulds, Ltd., and Hegan, H. J. Manufacture of filaments, etc., from cellulose compounds. 2,758. February 2.

Dreyfus, H. Manufacture of organic compounds. 2,454. January 30.

Durand and Huguenin Akt.-Ges. Manufacture of disazo-dyestuffs. 2,378. January 29. (Germany, January 29, 1923.)

Farbwerke vorm, Meister, Lucius, and Brüning, and Imray, O. Y. Manufacture of indigoid vat dyestuffs containing sulphur. 2,279. January 28.

Gros, F. Manufacture of hydrogen and acetylene. 2,759. February 2. (France, February 8, 1923.)

Gros, F. Pyrogenic transformation of acetylene or gaseous mixtures derived from acetylene. 2,760. February 2. (France, February 14, 1923.)

Heyl, G. E. Distillation and purification of sulphur-containing shale oils. 2,582. January 31.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of indigoid dyestuffs. 2,474. January 30.

Kernot, J. C. Treatment of hydrocarbon-yielding materials. 2,359. January 29.

Makow, V., and Wolffenstein, R. Production of hydrogen peroxide. 2,782. February 2.

Porter, J. A. Cheston-. Conversion of heavy hydrocarbons into lighter hydrocarbons. 2,698. February 1.

Soc. of Chemical Industry in Basle. Manufacture of a thionaphthisatin and its intermediate products. 2,379. January 29. (Czecho-Slovakia, November 29, 1923.)

Soc. of Chemical Industry in Basle. Manufacture of an indigoid dyestuff. 2,473. January 30. (Switzerland, February 9, 1923.)

Wallace, G. W. Treatment of liquid hydrocarbons, oils, or fats. 2,704. February 1.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, February 7, 1924.

A fairly satisfactory volume of business has passed during the past week, although the tendency has been slightly lower. On the other hand the Continental, and particularly the German, situation is developing and higher prices are indicated in most directions.

General Chemicals

ACETONE is firmer and an active market without change in price.

ACID ACETIC is very firm indeed and a further advance in price is expected.

ACID CITRIC.—The tendency seems to improve as the season approaches. There has been no movement in price, however, although both makers and operators are looking for higher prices.

ACID FORMIC is very scarce—price nominal.

ACID LACTIC is unchanged.

ACID OXALIC is in very short supply—stocks are firmly held.

ACID TARTARIC is quiet and uninteresting.

BARIUM CHLORIDE is unchanged.

BLEACHING POWDER is unchanged.

FORMALDEHYDE is firmer and in good demand.

LEAD ACETATE is unchanged.

LIME ACETATE is in active inquiry—price unchanged.

METHYL ALCOHOL is firm and an active market.

LITHOPONE is unchanged.

POTASSIUM CAUSTIC and CARBONATE unchanged.

POTASSIUM PERMANGANATE is unchanged.

POTASSIUM PRUSSIATE in fair demand at recent values.

SODIUM ACETATE is firm and advancing.

SODIUM PHOSPHATE is unchanged.

SODIUM NITRITE is in very short supply and likely to advance in price.

SODIUM PRUSSIATE is unchanged.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID.—The best brands continue in short supply, with the general market unchanged, although in some quarters second-hand holders are reported to have accepted slightly lower prices.

ACETANILID.—The market has been in buyers' favour, due to the arrival of fresh importations.

ACID SALICYLIC is easier.

BROMIDES.—As yet there is little change in the London market, due apparently to lack of demand. Continental dealers quote higher prices, and an advance is anticipated owing to renewed understanding between the German bromine manufacturers, who, it is reported, have raised their quotations substantially.

GUAIACOL CARBONATE is easier owing to a falling off in the demand for export.

HEXAMINE has been offered freely, closing slightly lower on the week.

MILK SUGAR has been in request and is a rising market.

SODA SALICYLATE is unchanged.

VANILLIN has been in good demand.

Coal Tar Intermediates

There has been slightly more interest shown in this market during the last week, without any special change in prices.

ALPHA NAPHTHOL is unchanged.

ALPHA NAPHTHYLAMINE has been in normal request and the price is steady.

ANILINE OIL has been of interest on both home and export account.

ANILINE SALT is unchanged.

BENZIDINE BASE.—Some home trade business has been placed.

BETA NAPHTHOL continues to be of interest on both home and export account.

DIMETHYLANILINE is without special feature.

DIPHENYLAMINE is firm at recent quoted figures.

NITRO BENZOL.—Home trade business has been placed, and is also inquired for on export account.

PARANITRANILINE.—Some export inquiries have been received and the price is steady.

"R" SALT continues to be of some interest.

XYLIDINE is unchanged.

Coal Tar Products

The only feature of interest which has occurred in the market for coal tar products during the past week is the rise in price of benzol consequent on the advance in petrol.

90% BENZOL.—The market is somewhat upset owing to the rise in price of petrol. Sellers are unwilling to offer, and the nominal price to-day is about 1s. 6d. per gallon on rails.

PURE BENZOL.—Although this product is not in very active demand, its value to-day should be about 1s. 10d. per gallon.

CREOSOTE OIL is quietly firm with no change in value from last week.

CRESYLIC ACID is quoted at 1s. 10d. per gallon on rails for the pale quality 97/99%, and the dark quality 95/97% is quoted at 1s. 6d. to 1s. 8d. per gallon. There is no great inquiry for this product, however.

SOLVENT NAPHTHA is slightly stronger, and is worth about 1s, per gallon on rails.

HEAVY NAPHTHA is also quoted at about the same figure.

NAPHTHALENES are quiet, the lower qualities being quoted at about £7 to £7 10s. per ton, the 74/76 quality being worth about £8 to £8 10s. per ton, and 76/78 quality £9 to £9 10s. per ton.

PITCH remains dull and prices continue to drop. To-day's values are:—70s. to 75s. per ton, f.o.b. London, 60s. to 65s. per ton f.o.b. East Coast and West Coast.

Sulphate of Ammonia

There is a satisfactory demand and prices are somewhat firmer.

The East London Mica Co., Ltd.

Meeting of Creditors

A MEETING of creditors of the East London Mica Co., Ltd., was held on Monday in London. Mr. W. Wesson, liquidator, occupied the chair.

No statement of affairs was presented, and Mr. Wesson said that the figures he had prepared were of a very approximate character. The liabilities totalled approximately £2,444 18s., and were made up as follows: unsecured creditors £581 18s. and directors' fees £1,863. The total assets were £3,388, from which had to be deducted preferential creditors £55, leaving approximate net assets of £3,333, or a surplus of assets over liabilities of about £800. If the assets were realised at the amounts mentioned there would be a possibility of all the creditors being paid in full, but this would depend entirely on the result of realisation. The directors' claims were made up as follows: Mr. Grout, the managing director of the company, £606 for fees, £130 for dilapidations, and £35 for rent. Mr. Grout was entitled to £250 per annum for salary, and he therefore ranked as an unsecured creditor for £606 10s. Mr. P. H. Butler (deceased) was entitled to £152 10s., Mr. Smith £144 10s. director's fees and £48 8s. 11d. petty cash, Mr. Beaumont (who resigned his directorship on the day of liquidation) £280 3s. 1d. Mr. McMillan £250, and Mr. Merritt £250. If all the directors stood aside there would be ample assets to pay the creditors.

The creditors did not pass any resolutions, and the liquidation therefore remains in the hands of the present liquidator.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	125	0	0	to	126	0	0
Acid, Acetic, glacial, 99–100%	ton	73	0	0	to	74	0	0
Acetic, 80% pure	ton	52	0	0	to	53	0	0
Acetic, 40% pure	ton	27	0	0	to	28	0	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	0	11½	to	0	1	0
Citric	lb.	0	1	5	to	0	1	5½
Formic, 85%	ton	65	0	0	to	68	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	39	0	0	to	40	0	0
Lactic, 60 vol.	ton	45	0	0	to	47	0	0
Nitric, 80 Tw.	ton	23	0	0	to	25	0	0
Oxalic	lb.	0	0	5½	to	0	0	6
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9½	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	0½	to	0	1	1
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	23	0	0	to	24	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	8	10	0	to	9	0	0
Sulphate, 17–18%	ton	10	10	0	to	11	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	30	0	0	to	32	0	0
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	32	0	0	to	33	0	0
Nitrate (pure)	ton	40	0	0	to	45	0	0
Phosphate	ton	63	0	0	to	65	0	0
Sulphocyanide, commercial 90%	lb.	0	1	1	to	0	1	3
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	66	0	0	to	68	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	14	10	0	to	15	0	0
Nitrate	ton	33	0	0	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	0	0	to	10	10	0
Borax crystals, commercial	ton	25	0	0	to		—	
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	22	0	0	to	23	0	0
Carbide	ton	13	0	0	to	13	10	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	80	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	25	0	0	to	25	10	0
Cream Tartar, 98–100%	ton	86	0	0	to	88	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	63	0	0	to	64	0	0
Formusol (Rongalite)	lb.	0	1	11	to	0	2	0
Glauber salts, commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal	0	2	0	to	0	2	1
Iron perchloride	ton	20	0	0	to	22	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	46	0	0	to	48	0	0
Carbonate (White Lead)	ton	50	0	0	to	52	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	37	0	0	to	39	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	3	10	0	to	3	15	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	8	0	0	to	9	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	48	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	80	0	0	to	85	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate, double salt	ton	37	0	0	to	38	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	5½	to	—		
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to	—		
Metabisulphite, 50–52%	ton	63	0	0	to	65	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	10	to	0	0	10½
Prussiate, red	lb.	0	2	6	to	0	2	8
Prussiate, yellow	lb.	0	0	9½	to	0	0	10
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	2	15	0	to	—		
Seconds	cwt.	2	17	6	to	—		
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	—		
Bisulphite, 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	2¾	to	0	0	3
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	31	0	0	to	32	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	6	to	—		
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62 %	ton	15	0	0	to	16	10	0
Sulphite, cryst.	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	1	0	to	0	1	1
Tin perchloride, 33%	lb.	0	1	1	to	0	1	2
Perchloride, solid	lb.	0	1	3	to	0	1	4
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	15	0	0	to	16	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	9	to	0	4	0
Acetanilid	lb.	0	3	0	to	0	3	3
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	10	to	0	3	3
Salicylic, B.P.	lb.	0	2	4	to	0	2	6
Tannic, leviss	lb.	0	3	0	to	0	3	3
Amidol	lb.	0	7	6	to	0	8	0
Amidopyrin	lb.	0	14	0	to	0	14	6
Ammon ichthosulphonate	lb	0	1	10	to	0	2	0
Barbitone	lb.	0	17	0	to	0	17	6
Beta naphthol resublimed	lb.	0	3	0	to	0	3	6
Bromide of ammonia	lb.	0	0	10½	to	0	1	0
Potash	lb.	0	0	8½	to	0	0	9
Soda	lb.	0	0	9½	to	0	0	10
Caffeine, pure	lb.	0	12	3	to	0	12	9
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	2	0	to	0	2	3
Calomel	lb.	0	3	9	to	0	4	0
Chloral hydrate	lb.	0	4	0	to	0	4	3
Cocaine alkaloid	oz.	1	2	0	to	1	2	6
Hydrochloride	oz.	0	17	0	to	0	17	6
Corrosive sublimate	lb.	0	3	3	to	0	3	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	2	4	to	0	2	6
B.P. (75–80% eucalyptol)	lb.	0	2	5	to	0	2	7
Guaiacol carbonate	lb.	0	13	0	to	0	13	3
Liquid	lb.	0	11	6	to	0	12	0
Pure crystals	lb.	0	12	6	to	0	13	0
Hexamine	lb.	0	4	0	to	0	4	3
Hydroquinone	lb.	0	4	3	to	0	4	6
Lanoline anhydrous	lb.	0	0	7	to	0	0	6
Lecithin ex ovo	lb.	1	5	0	to	1	7	6
Lithi carbonate	lb.	0	10	0	to	0	10	6
Methyl salicylate	lb.	0	3	0	to	0	3	6
Metol	lb.	0	9	0	to	0	10	0
Milk sugar	cwt.	4	5	0	to	4	10	0
Paraldehyde	lb.	0	1	7	to	0	1	9
Phenacetin	lb.	0	7	6	to	0	8	0
Phenazone	lb.	0	8	3	to	0	8	6
Phenolphthalein	lb.	0	8	0	to	0	8	3
Potassium sulpho guaiacolate	lb.	0	7	3	to	0	7	9
Quinine sulphate, B.P.	oz.	0	2	3	to		—	

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	6	3	to	0	6	6
Salicylate of soda powder	lb.	0	3	0	to	0	3	3
Crystals	lb.	0	3	0	to	0	3	3
Salol	lb.	0	4	0	to	0	4	3
Soda Benzoate	lb.	0	3	6	to	0	3	9
Sulphonal	lb.	0	17	0	to	0	18	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	3
Soda salicylate	lb	0	8	6	to	0	9	0
Vanillin	lb.	1	4	6	to	1	5	6

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	1	9	to	0	2	0
Refined	lb.	0	2	3	to	0	2	6
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	8½	to	0	0	8¾
Salts	lb.	0	0	9	to	0	0	9¼
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	9	to	0	3	0
Benzidine, base	lb.	0	4	6	to	0	4	9
Sulphate	lb.	0	3	6	to	0	3	9
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Crocoeine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	3	to	0	1	4
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	8	to	0	2	10
Diphenylamine	lb.	0	3	3	to	0	3	6
H-Acid	lb.	0	4	6	to	0	4	9
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	4	to	0	2	6
Naphthionate of Soda	lb.	0	2	4	to	0	2	6
Naphthylamine-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	7	to	0	2	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	9	to	0	0	10
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetic s

Essential Oils.		£	s.	d
Anise	c.i.f. 1/9 spot	0	1	10
Bay		0	12	0
Bergamot		0	14	3
Cajuput		0	3	3
Camphor, white	per cwt.	4	0	0
Brown	„	3	15	0
Cassia	c.i.f. 5/6 spot	0	8	0
Cedarwood		0	1	6
Citronella (Ceylon)	easier, c.i.f. 3/0 spot	0	3	4
(Java)	very firm, c.i.f. 4/4 spot	0	4	7
Clove	easier	0	9	0
Eucalyptus		0	2	4
Geranium Bourbon	easier	1	14	0
Lavender	firm	1	6	0
Lavender Spike	dearer	0	4	6
Lemon		0	3	0
Lemongrass	firm, per oz.	0	0	2¾
Lime (distilled)	firm	0	4	6
Orange sweet (Sicilian)		0	11	6
(West Indian)		0	9	6

		£	s.	d.
Palmarosa		0	18	0
Peppermint (American)	firm	0	16	0
Mint (dementholised Japanese)		0	14	0
Patchouli		1	5	0
Otto of Rose	per oz.	1	15	0
Rosemary		0	1	11
Sandalwood		1	5	0
Sassafras	dearer	0	10	6
Thyme	2/6 to	0	8	0
Synthetics.				
Benzyl acetate	per lb.	0	3	3
Benzoate	„	0	3	6
Citral	„	0	10	0
Coumarine	„	1	0	0
Heliotropine	„	0	8	0
Ionone	„	1	5	0
Linalyl acetate	„	1	2	6
Methyl salicylate	„	0	3	0
Musk xylol	„	0	18	0
Terpeniol	„	0	2	9

Arbitration and Trade Custom

Chemical Case in the Appeal Court

In the Court of Appeal, before Lords Justices Bankes, Scrutton and Sargant, on Thursday, the case of Scrimaglio *v.* Thornett and Fehr, was heard upon the appeal of the plaintiffs from the judgment of Mr. Justice Greer.

The action was brought by Messrs. Scrimaglio, merchants, of Genoa, against Messrs. Thornett and Fehr, of Leadenhall Street, E.C., in connection with a tallow contract and a deal in soda ash.

The plaintiffs' claim was for £392, the overpayment in respect of certain packages of vegetable tallow, but the claim was admitted subject to the defendants' counterclaim, which arose on two contracts by which the plaintiffs agreed, to purchase from the defendants 200 tons of soda ash c.i.f. Genoa. Defendants alleged that the plaintiffs had committed a breach of the agreement by refusing to take up shipping documents that were tendered in accordance with the contract. The plaintiffs' liability in respect of their repudiation was referred to arbitration by the Court. Defendants appointed Mr. Charles Mangold as their arbitrator, but no arbitrator having been appointed by the plaintiffs, Mr. Mangold heard the arbitration and awarded the defendants £1,800 damages against the plaintiff, which sum the defendants now claimed by their counterclaim. The plaintiffs denied liability for repudiation upon the ground that the only arbitration in contemplation was an arbitration in London in the usual way, and under the Arbitration Act, which meant only a single arbitrator appointed by the Court. Plaintiffs further said that there was no concurrence in the appointment of Mr. Mangold, who had no power to make an award, which was bad on its face. Plaintiffs further said that arbitration was the usual way in London meant arbitration according to the rules of the Chemical Trade Association, which meant that the Committee Arbitrator was appointed in accordance with their rules. Defendants, on the other hand, contended that the habitual rule in the trade was for arbitration by two arbitrators and an umpire. The British Chemical Trade Association was a reasonable one, and if one side failed to appoint an arbitrator, application could be made to the Committee to appoint an arbitrator to fill the vacancy.

After hearing the evidence on both sides as to the custom in the trade, Mr. Justice Greer, in giving judgment, said the material words in the contract were: "Any dispute arising out of this contract shall be settled by arbitration in London in the usual way." He was satisfied that the words "in the usual way" referred to the chemical trade and were in accordance with the practice of the trade. This resulted in its being necessary to appoint two arbitrators who, if they differed, appointed an umpire. The result was that on the preliminary point which had been ordered to be tried, his decision was in favour of the defendants, and after deducting the amount of the plaintiffs' claim, which was admitted, he gave judgment for the defendants for £4,414 12s. 7d, with costs and from this result the plaintiffs now appealed.

Mr. A. Neilson and Mr. C. W. Pitman appeared for the appellants; and Mr. Jowitt, K.C., and Mr. James Dickenson represented the respondents.

The appeal was dismissed.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, February 7, 1924.

DURING the past week business has been quiet, and there is nothing of importance to record.

Prices for home products are fairly steady, but Continental offers, for forward delivery, are inclined to be lower.

Industrial Chemicals

ACID ACETIC.—Glacial, 98/100%, £60 to £68 per ton; 80% pure, £50 to £52 per ton; 80% technical, £47 to £49 per ton, all packed in casks, delivered c.i.f. U.K. ports, duty free.

ACID BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC (ICE CRYSTALS).—Still further reduced in price. Now quoted about 8¾d. per lb.

ACID CITRIC, B.P. CRYSTALS.—Nominally 1s. 4½d. per lb., less 5%, but could probably be obtained for less.

ACID FORMIC, 85%.—Little spot material available. Price about £64 to £65 per ton, ex store.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Unchanged at about 5½d. per lb., ex store, spot delivery.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Spot lots on offer at about 1s. 0½d. per lb., less 5% ex store. Offered for early delivery at 1s. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18% IRON FREE.—Moderate inquiry. Spot lots about £8 10s. per ton, ex store. Offered for forward delivery at about £7 7s. 6d. per ton, c.i.f. U.K. port.

ALUM CHROME.—Price unchanged at £26 to £28 per ton, according to quality, delivered f.o.b. U.K. port.

ALUM POTASH (LUMP).—Quoted £10 17s. 6d. per ton, f.o.b. U.K. port for export. Continental material on offer at about the same price, ex store.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 5d. per lb., ex station, prompt delivery.

AMMONIA CARBONATE.—Lump, £35 per ton; powdered, £37 per ton, packed in casks, carriage paid U.K. station.

AMMONIA LIQUID, 880°.—Unchanged at 3d. per lb., delivered; containers extra.

AMMONIA MURIATE.—Grey galvanisers quality offered at £31 to £32 per ton, ex station, spot delivery. Fine white crystals quoted £27 15s. per ton, ex store.

AMMONIA SULPHATE.—25¼%, £13 10s. per ton; 25¾%, £14 13s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Spot lots now quoted at about £71 to £72 per ton, ex store. Offered for forward delivery at about £69 per ton, ex wharf.

BARIUM CARBONATE.—98/100% powdered. Offered from the Continent at £12 10s. per ton, c.i.f. U.K. port.

BARIUM CHLORIDE, 98/100%.—English material unchanged at about £15 per ton, ex store. Offered from the continent at slightly less.

BARYTES.—Finest white English unchanged at £5 5s. per ton, ex works. Good quality continental material offered at £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d per ton, ex station. Offered from the continent at about £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Good export inquiry. Price about £3 10s. per ton, f.o.b. U.K. port, packed in casks.

COPPER SULPHATE.—In little demand. Price about £25 per ton, less 5% f.o.b. U.K. port.

FORMALDEHYDE, 40%.—Moderate inquiry. Quoted, £62 15s. per ton, ex store, spot delivery.

GLAUBER SALTS.—English material, £4 per ton, ex store or station. Continental offering at about £3 5s. per ton, c.i.f. U.K. port.

LEAD, RED.—English makers' price nominally £46 10s. per ton, carriage paid U.K. stations, but cheaper parcels on offer. Continental material quoted £38 10s. per ton, c.i.f. U.K. port.

LEAD, WHITE.—Continental material on offer at about £41 per ton, ex store.

LEAD ACETATE, WHITE CRYSTALS.—Little spot material available. Price about £47 to £48 per ton, ex store. Offered from the continent at £46 15s. per ton, c.i.f. U.K. port.

MAGNESITE, CALCINED.—Finest English material offered at £8 per ton, ex station.

MAGNESIUM CHLORIDE.—Spot lots now quoted at about £3 10s. per ton, ex store. Offered from the continent at about £3 5s. per ton, c.i.f. U.K. port.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial quality offered at about £5 per ton, ex store. B.P. quality, £6 5s. per ton, ex station, prompt delivery.

POTASH CAUSTIC, 88/92%.—Quoted £32 to £33 per ton, ex store, spot delivery. Offered from the continent at about £28 10s. per ton, c.i.f. U.K. port.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—Slightly cheaper quotations from the continent, quoted £25 per ton, c.i.f. U.K. ports. Spot lots on offer at about £27 10s. per ton, ex store.

POTASSIUM CHLORATE.—Little inquiry. Spot lots unchanged at about 3½d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE).—Continental offers inclined to be higher. Now quoted £25 10s. per ton c.i.f. U.K. port, prompt shipment. Spot lots on offer at about £32 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 10¼d. per lb., ex store, spot delivery. In little demand.

POTASSIUM PRUSSIATE (YELLOW).—Makers' price further reduced. Now quoted 9d. per lb., f.o.b. U.K. port for export. Spot material on offer at 9¼d. per lb., ex station.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62% broken, £19 2s. 6d. per ton; 98/99% powdered, £22 15s. per ton. All ex-station, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Quoted £25 per ton, ex store, spot delivery. Offered for early delivery at about £23 15s. per ton, ex wharf.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English makers' price unchanged at 4½d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station. Alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English makers' price about £10 per ton, ex station. Continental obtainable at about the same figure. Pea crystals quoted £15 per ton, ex store.

SODIUM NITRATE.—Refined 96/98% quality quoted £13 10s. per ton, f.o.r. or f.o.b. U.K.

SODIUM NITRITE, 100%.—Quoted £26 10s. to £28 10s. per ton, according to quantity, f.o.b. U.K. port.

SODIUM PRUSSIATE (YELLOW).—Unchanged at about 5d. per lb., f.o.b. U.K. port for export. Spot material available at about 5¼d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption £4 5s. per ton carriage paid stations. Good export inquiry.

SODIUM SULPHIDE.—60/62% solid, £15 per ton ex station; broken, £1 per ton more; 31/34% crystals, £9 7s. 6d. per ton, ex station.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

TIN, CRYSTALS.—Quoted 1s. 3½d. per lb., f.o.b. U.K. port.

ZINC CHLORIDE, 98/100%.—Moderate export inquiry. English material quoted £26 per ton, f.o.b. U.K. port.

ZINC SULPHATE.—Offered from the continent at £13 10s. per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHOL.—Limited supplies offered. Price, 2s. 6d. lb., delivered.

BENZIDINE BASE.—Good export demand. Price 4s. 6d. lb., 100% basis.

BETA NAPHTHOL.—Good demand. Price, 1s. 1d. lb., delivered.

DIMETHYLANILINE.—Some export inquiry. Price 2s. 5d. lb., f.o.b., drums included.

"G" SALT.—Small export inquiry. Price 3s. 10½d. lb., 100% basis, f.o.b.

"H" ACID.—Considerable export inquiry. Price, 4s. 5½d. lb., 100% basis.

PURE METHYL ALCOHOL.—Market firm. Price £76–£80. per ton, c.i.f., drums inclusive.

ORTHO AMIDOPHENOL.—Some inquiry. Price 12s. lb., 100% basis, delivered.

ORTHO TOLUIDINE.—Some export inquiry. Price 10d. lb., f.o.b.

PARA DICHLORBENZOL.—Supplies are offered at 9d. lb.

PARA AMIDOPHENOL.—Export inquiry. Price 8s. 5d. lb., 100% basis.

PARANITRANILINE.—Large export inquiry. Price 2s. 3d. lb., f.o.b.

British Chemical Standards

THE organisers of the British Chemical Standards movement announce the publication of the complete certificate of analyses of the following samples:—

	Carbon steel "C"	Carbon steel "P"
Carbon	0·091%	0·205%
Sulphur	—	0·073%
Phosphorus ..	—	0·105%
Manganese	0·50 (approx.)	0·706%
	Cast Iron "D"	
Phosphorus	1·19%	

The samples were first issued about 8 months ago, but it has not been possible to publish the full details of all the figures until now. Each of the standard steels has been tested by a selection of about a dozen prominent chemists, representing Independent analysts (metallurgical); U.S. Bureau of Standards; English, French, Italian and United States; Iron and Steel Works chemists (both makers and users). A special feature of steel "P" certificate is that it contains full notes of the methods actually used by the co-operating analysts. The standard samples may be obtained in 50, 100 and 500 gramme bottles, either direct from Organising Headquarters, 3, Wilson Street, Middlesbrough, or through any of the leading laboratory furnishers, at a price just sufficient to cover the cost. The usual certificate giving the names of the analysts, the types of methods used, and a detailed list of the results will be supplied with each bottle. The full list of all the standards now available may be had on request.

Agricultural Science at Oxford

AT Oxford University, on Tuesday, Professor G. W. S. Adams moved a decree in convocation authorising the acceptation of grants from the Development Commission and the Ministry of Agriculture and Fisheries for the purpose of research in agricultural engineering. Professor Adams explained that this was part of a national scheme for agricultural research, and that the Government had decided that the Central Institute should be placed at Oxford. The institute would be concerned with the whole question of treatment of the soil, and problems would be raised of importance not merely to agriculture but to science in general. The Government would supply both capital and current expenditure, while the University would be asked to provide a site. The decree was accepted unanimously.

The Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, February 7, 1924.

The condition of the chemical market here during the past week has not greatly changed since our last report. A moderate amount of business has been done in most of the bread and butter lines of chemicals, and sellers are hopeful, if the threatened transport trouble can be avoided, of an improvement in the volume of trade. The principal reason for this optimism lies, apparently, in the number of inquiries which have been received. With one important exception, the coal-tar products group, prices are keeping reasonably steady.

Heavy Chemicals

Bleaching powder is firmly maintained at £10 per ton, with a moderately active demand both on home and export account. Hyposulphite of soda is still rather quiet and quotations are a shade easier, photographic crystals being on offer at £14 10s. to £15 per ton, and commercial quality at £9 10s. Glauber salts keep steady and meet with a fair inquiry at £3 10s. to £3 15s. per ton. Little or no improvement in the demand for sulphide of sodium can be reported: 60–65 per cent. concentrated solid is quoted at £14 10s. to £15 per ton and crystals at about £9. Prussiate of soda is inactive and still rather weak at 5½d. per lb. Saltcake is firm at £4 10s. per ton, with both home and foreign demand on a fairly satisfactory scale. This statement also applies to caustic soda, with quotations varying from £16. 17s. 6d. for 60 per cent. to £19 7s. 6d. per ton for 76–77 per cent. material. Bicarbonate of soda is maintained at the level of £10 10s. per ton, with business on quietly steady lines. Nitrite of soda continues very firm on shortage of supplies, to-day's value being £28 to £28 10s. per ton. Phosphate of soda is still offering at £14 per ton, but only a small amount of buying interest in this material is being shown. The demand for bichromate of soda is fairly good and the price is steady at 4½d. per lb. Soda crystals are quiet but unchanged at £5 5s. per ton. Alkali goes steadily into consumption and values are maintained; 58 per cent. material is offering at round £7 per ton. Acetate of soda keeps very firm, and to-day is quoted at £24 per ton. The demand for chlorate of soda continues quiet at 2¾d. per lb.

Caustic and carbonate of potash still occupy a strong position, quotations keeping very firm: caustic is on the basis of £30 to £32 per ton for 90 per cent. strength, and carbonate at round £27 per ton for 88–92 per cent. Bichromate of soda is in fairly active inquiry and prices are steady at 5¾d. per lb. Permanganate of potash is unchanged in position or value, quotations varying from 8d. to 9d. per lb. according to quality. Yellow prussiate of potash is quiet but steadier at 8½d. per lb. Chlorate of potash is selling sparingly with values ranging between 2¾d. and 3d. per lb.

In some quarters a rather more active interest in arsenic is reported, and white powdered, Cornish makes, is firmly held at about £67 per ton, Manchester. There has been little change in the position of sulphate of copper, which is quoted at £25 10s. per ton, f.o.b.; inquiry for shipment is still on modest lines. Nitrate of lead is only in quiet demand, but quotations are firm at £42 to £43 per ton. Acetate of lead continues steady at £45 to £46 for both white and brown qualities. Acetate of lime is rather dearer than at last report, grey being quoted at £22 and brown at £14 10s. to £15 per ton; parcels for early delivery are scarce. Commercial Epsom salts are quiet but steady at £4 10s. per ton; magnesium sulphate, B.P., is firm at £6 10s. per ton.

Acids and Tar Products

The position of the acids has undergone little change. Tartaric is in rather quiet demand at 1s. 1½d., with citric much the same at 1s. 4½d. Oxalic acid continues inactive, but prices are fairly steady at 5½d. per lb. Acetic acid is the strongest section; 80 per cent. commercial quality is very firm at £48 per ton, with glacial quoted at round £70.

Coal-tar products generally are weak. Pitch still meets with little activity, and values, though nominal, are easier at £3 to £3 10s. per ton. Creosote oil keeps steady at 9d. to 9¼d. per gallon, a fair amount of business being put through. Crude carbolic acid is now quoted at about 2s. 2d. per gallon, and crystals at 9d. per lb. Refined naphthalene is easier at round £17 per ton, crude varying from £6 to £10. Solvent naphtha is dull at 1s. to 1s. 1d. per gallon.

Company News

JOHN KNIGHT.—The profit for the year to November 30 last was £147,166 and £68,017 was brought in, making a total of £215,183 available for distribution. After paying a dividend on the cumulative preferred ordinary shares of 25 per cent., the directors propose to pay a dividend on the ordinary shares at the rate of 30 per cent. per annum, leaving a sum of £69,183 to be carried forward.

HORACE CORY AND CO.—The report for the year 1923 states that the profit, after reserving £550 for corporation profits tax and £2,000 for general reserve, is £13,086, and £2,672 was brought in, making a total of £15,758. The directors recommend a final dividend on the ordinary shares of 6 per cent., which will absorb £6,000, making 10 per cent. for the year, leaving £3,008 to be carried forward.

SOUTH STAFFORDSHIRE MOND GAS.—The report for 1923 states that about 5 per cent. more fuel was gasified and 11 per cent. more gas distributed than in 1922. The amount overspent on capital account was reduced during the year from £3,336 to £2,927. A gross profit of £18,468 is shown (against £14,571), and after deducting debenture and bank interest the net profit was £9,309 (against £5,176). In view of the amount of the bank overdraft (which was reduced during the year from £55,992 to £52,211) the directors do not propose to pay the dividend on the preference shares. There is now a total credit to profit and loss account in the balance-sheet of £18,027.

NAGADI SODA CO.—In a circular to the shareholders the directors announce that they have decided to call another meeting for the purpose of passing the resolution for voluntary liquidation recently defeated. This meeting will be held on February 13 at Winchester House. They state that unless a scheme of reconstruction which ensures the raising of adequate working capital is carried, the interest of the shareholders will be non-existent, the concessions will be forfeited, and the assets on realisation will not suffice to meet the claims of debenture-holders and creditors. Proxies in favour of the board must be lodged at the company's offices not later than 3 p.m. on February 11.

SOUTH METROPOLITAN GAS CO.—The revenue account for the year 1923 shows a credit balance of £530,699 (against £741,903 for 1920). The balance brought forward was £234,986 (against £582). Debenture interest and other fixed charges being met, the dividend of 5 per cent. has been paid on the preference stock, and the dividend for the year on the ordinary stock is 5¾ per cent. (against 5½ per cent.). An allocation of £16,500 is to be made to the reserve fund, and the balance to be carried forward is to be increased by £19,524 to £254,510. The capital liability of the undertaking has been reduced during the year by the redemption of £147,420 5 per cent. preference stock, issued in 1917. The balance of this stock will be redeemed in December next.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICALS FOR ESTHONIA.—A commission agent in Reval desires to secure the representation for Esthonia of British manufacturers of industrial chemicals. (Reference No. 150.)

CHEMICAL FERTILISERS FOR SPAIN.—A commission agent of Barcelona is desirous of obtaining the representation of British firms exporting wall papers and chemical fertilisers. (Reference No. 155.)

COAL TAR PRODUCTS FOR U.S.A.—A firm of importers in San Francisco wishes to communicate with British manufacturers of tiles, cement, coal tar products and cork insulation, with a view to obtaining agencies for the Pacific Coast of the United States. (Reference No. 163.)

Recent Will

Dr. John Edward Stead, of Everdon, Coatham, Redcar, metallurgical chemist, senior partner in Pattison and Stead, a member of and a former President of the Iron and Steel Institute £72,550

The Gas Light and Coke Company

Increased Dividend and Satisfactory Position

THE annual meeting of the proprietors of the Gas Light and Coke Co., Ltd., was held on Friday, February 1. The report and accounts were taken as read.

In the course of his speech the chairman said that with regard to the year that was just ended, the business of the company had been most satisfactory, especially considering the state of depression in trade through which the country had been passing. The sale of gas showed an increase of 5 per cent., which was very gratifying, particularly when it was borne in mind that this came upon the top of an increase of 8 per cent. in 1922. In addition they had reduced the price of gas, and increased the dividend to £5 4s. per cent. for the June half year, while £5 6s. 8d. per cent. was now recommended. They had undertaken certain reconstruction schemes that would otherwise have been carried out at a later date, on the request of the Government, in order to alleviate unemployment. The price of gas was relatively low, being only about 50 per cent. above the 1914 figure, while the average cost of the raw materials used was nearly 100 per cent. higher. The revenue had decreased by £1,300,000 from the sale of gas, but on the other hand there had been an increased profit from residual products.

Public Utility of Gas Undertakings

The chairman also drew some pointed comparisons with electrical undertakings on the score of general utility. He said that if their company were to be swept out of existence and replaced by an electrical undertaking, that undertaking would require to use at least three million tons of coal instead of the two millions they used. There was also this great advantage in favour of gas, that whereas that electrical undertaking would completely use up the three million tons of coal their company, having treated the two million tons of coal and obtained the gas, would still have remaining 1,250,000 tons of coke and breeze, 19 to 20 million gallons of tar, and a large quantity of ammonia. The coke was available for other industries and domestic purposes, and being a smokeless fuel helped very materially to improve the atmosphere of the city. The tar produced materials for dressing the surface of roads, dyestuffs, creosote for pickling timber, benzol spirit for motors, and many other things. From ammoniacal liquor was produced sulphate of ammonia, a nitrogenous fertiliser second to none in the world. The company, therefore, together with the rest of the industry, was not only serving its own day and generation well, but was safeguarding the future of the country by conserving its coal supply. Our coal deposits were by no means unlimited, and it was upon them that the continuation of our prosperity as a nation depended.

During the past year the directors had instituted a Gas Light and Coke Company Fellowship at the Imperial College of Science and Technology, South Kensington, to enable research work to be carried out by a post-graduate.

The British Dye Industry

Towards the close of his remarks the chairman said:—"Although as a rule I do not refer to politics from this chair there is one matter I should like to mention. I hope there will be no attempt to repeal the Dyestuffs (Import Regulation) Act passed in 1920. The Germans had practically got a monopoly of the manufacture of dyestuffs, and that branch of the chemical industry, to the great disadvantage of this country at the outbreak of war. It is quite impossible for this country to build up a dye industry without some measure of protection at all events during the first years. A great deal has been done already under this Act to make Great Britain independent of foreign supplies, but much remains to be done. This company has taken its share in this work and has spent considerable sums of money, relying upon this Act. If it were to be repealed there is little doubt that foreign competition would be such as to make it unprofitable to make dye materials in this country, to our great detriment and the additional disadvantage of throwing a great number of men out of work."

Referring to the British Empire Exhibition, the chairman said that the industry was arranging a suitable exhibit, and their company was contributing its share in providing money for this purpose. The main object of the British Empire gas exhibit would be to show the public the domestic and industrial applications for gas and educate them in all the ways in which gas could serve in the house and in business.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BOORMAN AND CO. (BRISTOL), 29, East Street, Bedminster, chemists. (C.C., 9/2/24.) £14 1s. 1d. November 13.

BOWSHER, Reginald, Amesbury, pharmaceutical specialist. (C.C., 9/2/24.) £42 3s. 1d. November 29.

GOLDSTEIN, Mr. I., 52, Great Alie Street, E., dyer and cleaner. (C.C., 9/2/24.) £23 19s. 9d. December 17.

SENIOR CROZIER AND CO., Union Works, Union Street, Stratford, chemists. (C.C., 9/2/24.) £64 11s. 6d. November 6.

STEVENS, Mr. R. (trading as RAPID SERVICE CO.) 133, Coleherne Court, S.W., dyer. (C.C., 9/2/24.) £12. December 20.

UNITED LABORATORIES AND CHEMICAL CO., LTD., 97, Queen Victoria Street, E.C., chemists. (C.C., 9/2/24.) £19 13s. 6d. November 13.

Bill of Sale

MOTTERSHEAD, Thomas Henry, 82, Tootal Drive, Weaste, chemical merchant. (B.S., 9/2/24.) £70. January 31.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

SWITHEN BLEACHWORKS, LTD., Haigh, Yorks. (M., 9/2/24.) Registered January 24, £350 4th debenture and £120 5th debenture, to Mrs. R. M. Wakefield and W. C. Wakefield, Church Lane, Thornhill, Dewsbury; general charge. *Nil. June 18, 1923.

TANKO, LTD., London, N., manufacturers of solidified petroleum. (M., 9/2/24.) Registered January 29, £1,000 debentures balance of £2,000; general charge. *£1,000. August 24, 1922.

WARE (W.) AND CO., LTD., Grays, dyers. (M., 9/2/24.) Registered January 22, £1,600 debenture to Mrs. F. E. M. Cleathero, Majella, Dundonald Drive, Leigh-on-Sea; general charge.

YOUNG (B.) AND CO., LTD., London, S.E., glue and size makers. (M., 9/2/24.) Registered January 19, two Land Registry charges to Bank; charged on properties in Dunlop Place and Yalding Road, both Bermondsey, with machinery, etc. *Nil. December 21, 1922.

London Gazette

Companies Winding Up Voluntarily

BENNISONS, LTD. (C.W.U.V., 9/2/24.) P. S. Booth, 26, Kimberley House, Holborn Viaduct, London, E.C., certified accountant, appointed liquidator.

MACCLESFIELD AND DISTRICT BUTCHERS' BY-PRODUCTS COMPANY, LTD. (C.W.U.V., 9/2/24.) S. G. Bown, 91, Derby Street, Macclesfield, chartered accountant, appointed liquidator. Meeting of creditors at the large Sunday School, Roe Street, Macclesfield, on Tuesday, February 12, at 3 p.m. Creditors' claims by February 29th.

Notice of Dividend

FULFORD, Arthur, trading as A. FULFORD AND CO., 71, Bowdon Street, Sheffield, wholesale druggist. First and final dividend of 1s. per £, payable February 13. Offices of Poppleton, Appleby and Turner, 155, Norfolk Street, Sheffield.

Partnerships Dissolved

BURNETT, F., AND CO. (Frank Burnett WAGSTAFF and George Herbert WEBSTER), manufacturers of aniline colours, etc., 8, Princess Street, Huddersfield, in the county of York, by mutual consent as from December 31, 1923. Debts received and paid by G. H. Webster, who is continuing the business.

NEVINS, M., AND RUSSELL, W. (Horace William NEVINS and Walter George RUSSELL), chemists and druggists, 20, Tacket Street, Ipswich, Suffolk, as from December 1, 1923, by mutual consent.

New Companies Registered

AQUATOLE MFG. CO., LTD., 29 and 30, Shoe Lane, London, E.C.4. Metallurgists, chemists, iron and steel converters, etc. Nominal capital, £6,000 in £1 shares.

BRITISH AND COLONIAL CHEMICAL CO., LTD., 24, Westminster Palace Gardens, Victoria Street, London, S.W. Agents, merchants, distributors and manufacturers of charcoal and other products, etc. Nominal capital, £5,000 in £1 shares.

BURROUGHS WELLCOME AND CO. (SOUTH AMERICA), 67, Holborn Viaduct, London, E.C. To acquire the business carried on by H. S. Wellcome at Buenos Aires and elsewhere in South America as "Burroughs Wellcome and Co.," together with all or any of the assets and liabilities thereof, and to carry on the business of importers and exporters of and dealers in pharmaceutical preparations, drugs, etc.; chemical manufacturers, chemists, photographic dealers, etc. Nominal capital, £10,000 in £1 shares.

COBDEN CHEMICAL CO., LTD. Chemical, dye and colour manufacturers, drysalters, etc. Nominal capital, £1,000 in £1 shares. A director: F. E. Hobson, 159, Gerald Road, Pendleton, Manchester.

WILLIAM DONALD AND CO. (GLASGOW), LTD., 19, St. Vincent Street, Glasgow. Dehydrators and evaporators, calciners, burners of lime and any other material, manufacturers of dyes and chemicals, etc. Nominal capital, £10,000 in £1 shares.

GEORGE EADE, LTD., 232, Goswell Road, London, E.C.1. Manufacturing chemists. Nominal capital, £20,000 in £1 shares.

JOHN HAWORTH AND CO., LTD. Dressers, producers and merchants of china and mica clay, chemical manufacturers and merchants, etc. Nominal capital, £12,000 in £1 shares. A director: James Haworth, The Greylands, Whitefield.

INDUSTRIAL CARBONISATION, LTD., 1 Charing Cross, London, S.W.1. Retorters, distillers, extractors and refiners, and in particular of oils and other products to be derived from shale, coal and other carbonaceous and oleiferous substances; analytical, consulting, industrial and manufacturing chemists, etc. Nominal capital, £50,000 in 40,000 "A" shares of £1 each and 200,000 "B" shares of 1s. each.

LORD, TRENCH AND CO., LTD., 168-9, Dashwood House, New Board Street, London, E.C.2. Manufacturers, importers and exporters of and dealers in chemicals, chemical products and by-products of all kinds, chemical, bleaching, dyeing, disinfecting and fertilising substances, ammonia and tar distillers, etc. Nominal capital, £10,000 in £1 shares.

L. R. B. PEARCE, LTD., 275, High Holborn, London, W.C.1. Wholesale, retail, manufacturing and dispensing chemists, etc. Nominal capital, £4,000 in £1 shares.

THE ANGLO SCOTTISH BEET SUGAR CORPORATION, LTD. Manufacturers and refiners of and dealers in all kinds of sugar and sugar products, saccharine, molasses, etc. Nominal capital, £250,000 in £1 shares. A director: J. B. Talbot-Crosbie, Raheen, Bearsden, Glasgow.